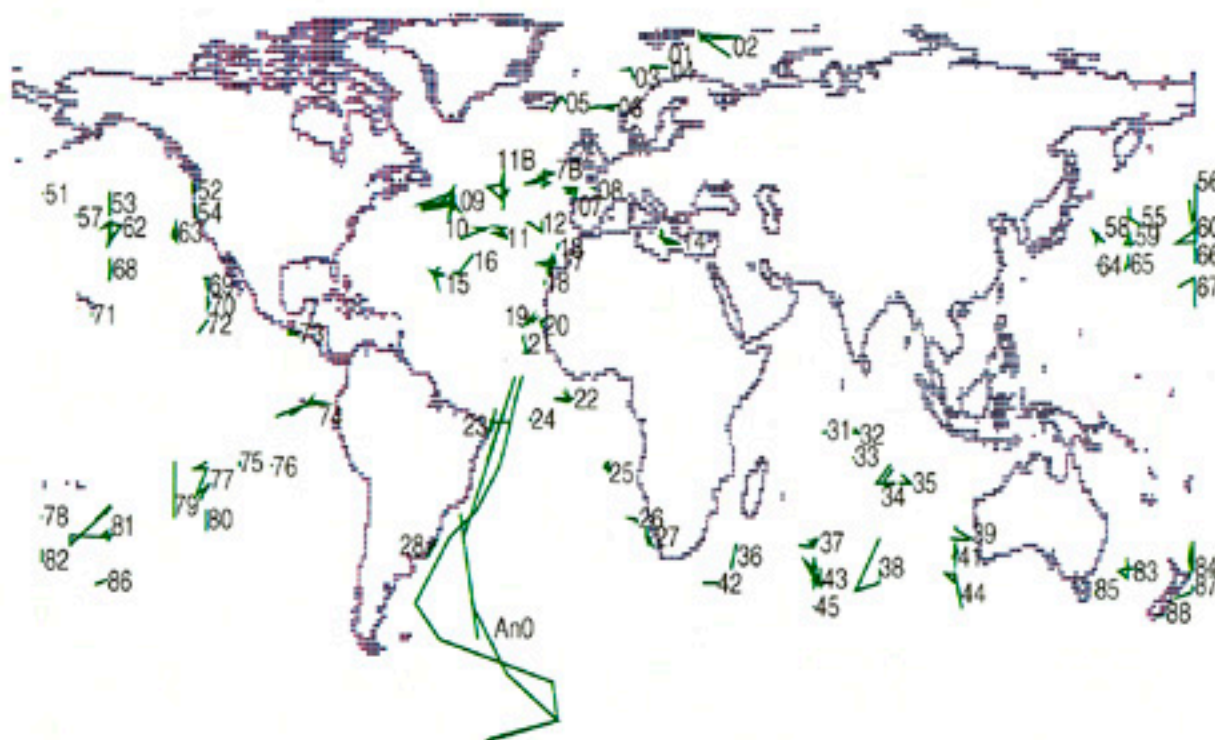


## Carbon-14 Measurements in Surface Water CO<sub>2</sub> from the Atlantic, Indian and Pacific Oceans, 1965-1994



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**NOTE:** When using these radiocarbon data in a presentation or publication, **PLEASE** acknowledge the principal investigator, Reidar Nydal, and the Norwegian University of Science and Technology (NTNU).

Special thanks go to the Norwegian shipping companies Fred Olsen (1966–1972) and Wilh. Wilhemsen (Barber International) (1966–1995) for collecting the samples for all those years with minor expenses to the Radiological Dating Laboratory. Thanks also to the laboratory staff and other persons involved in several ways in this project during the years. (See Appendix B and References). The financial support from the Norwegian Research Council is also gratefully acknowledged.

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**CARBON-14 MEASUREMENTS IN SURFACE WATER CO<sub>2</sub> FROM THE  
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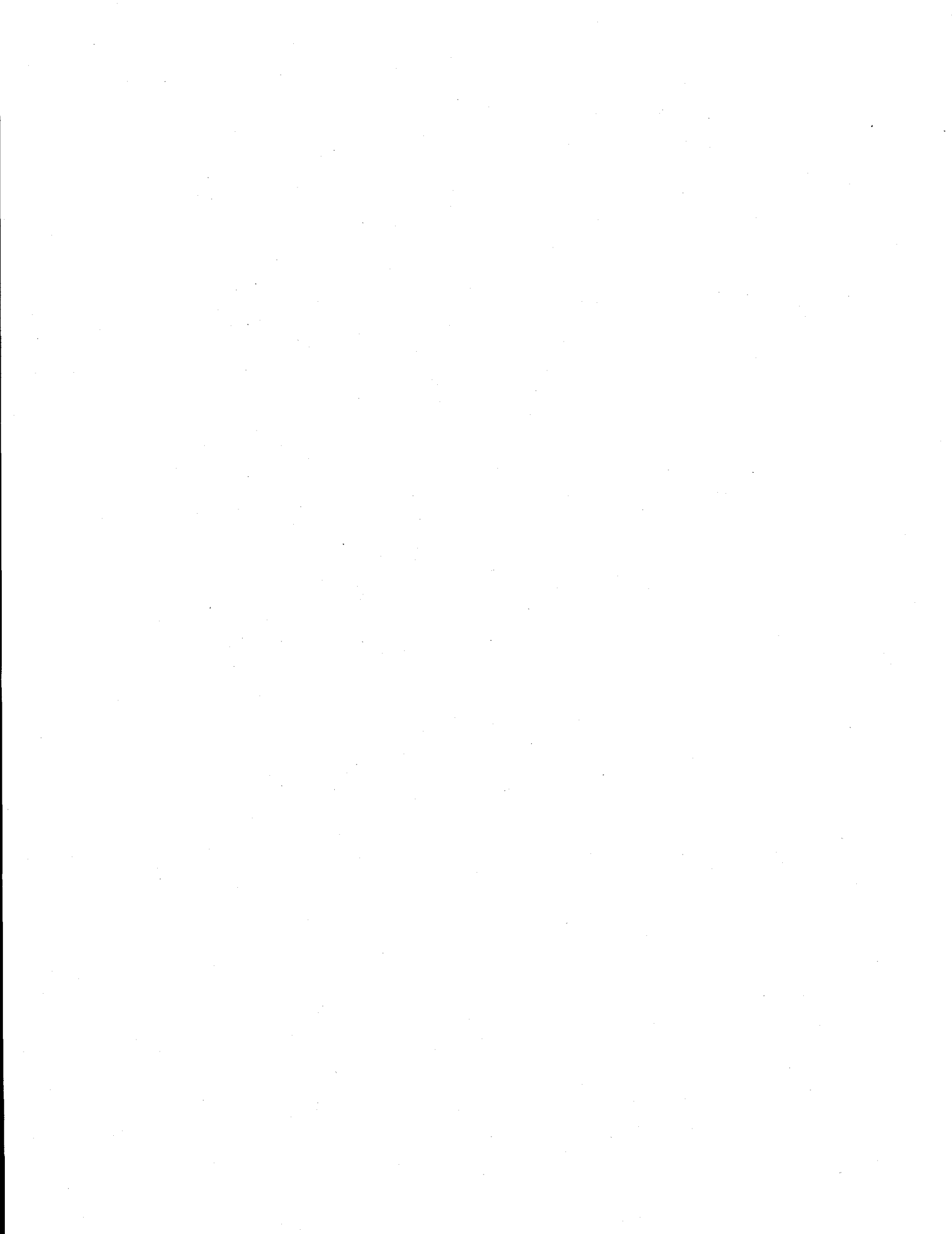
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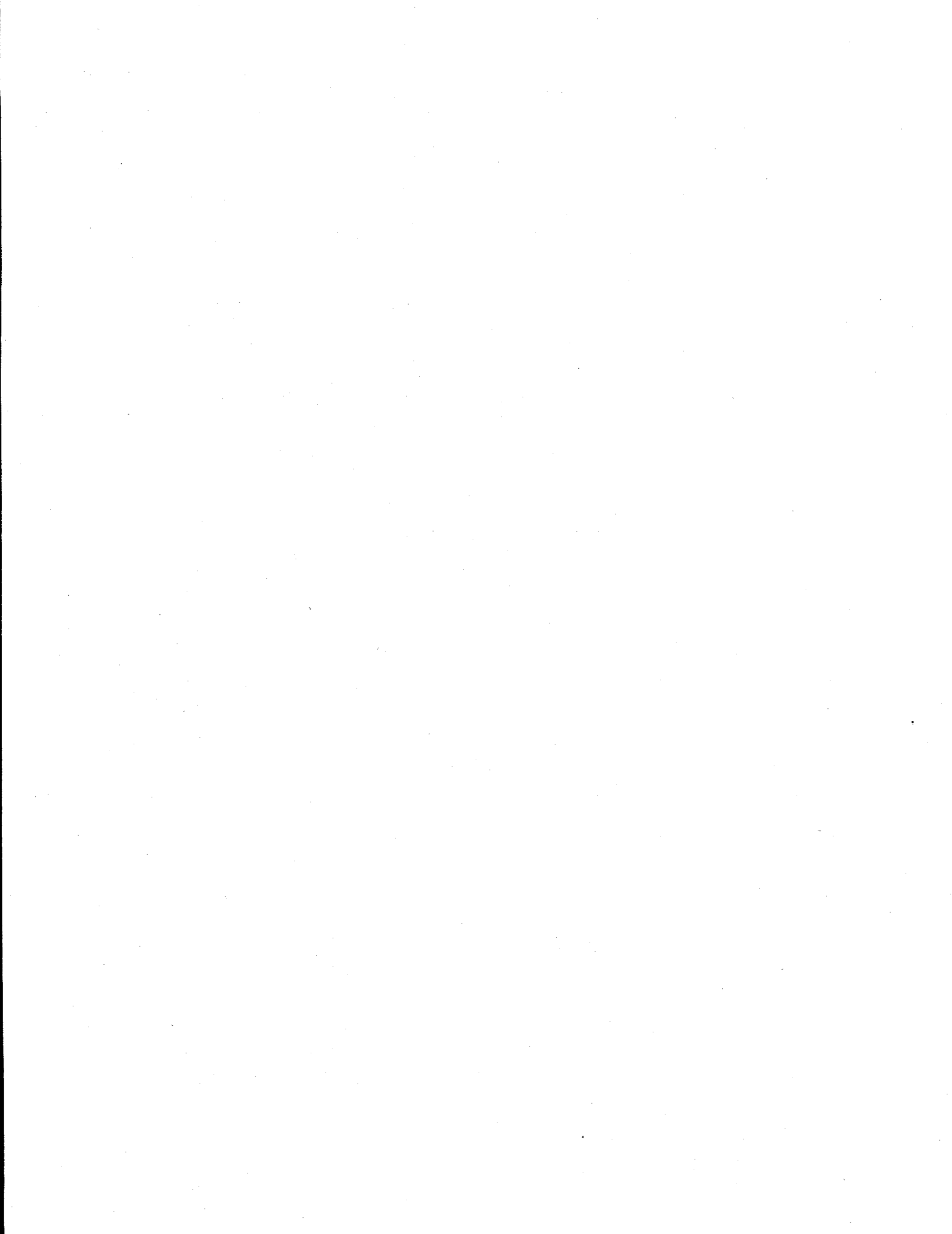
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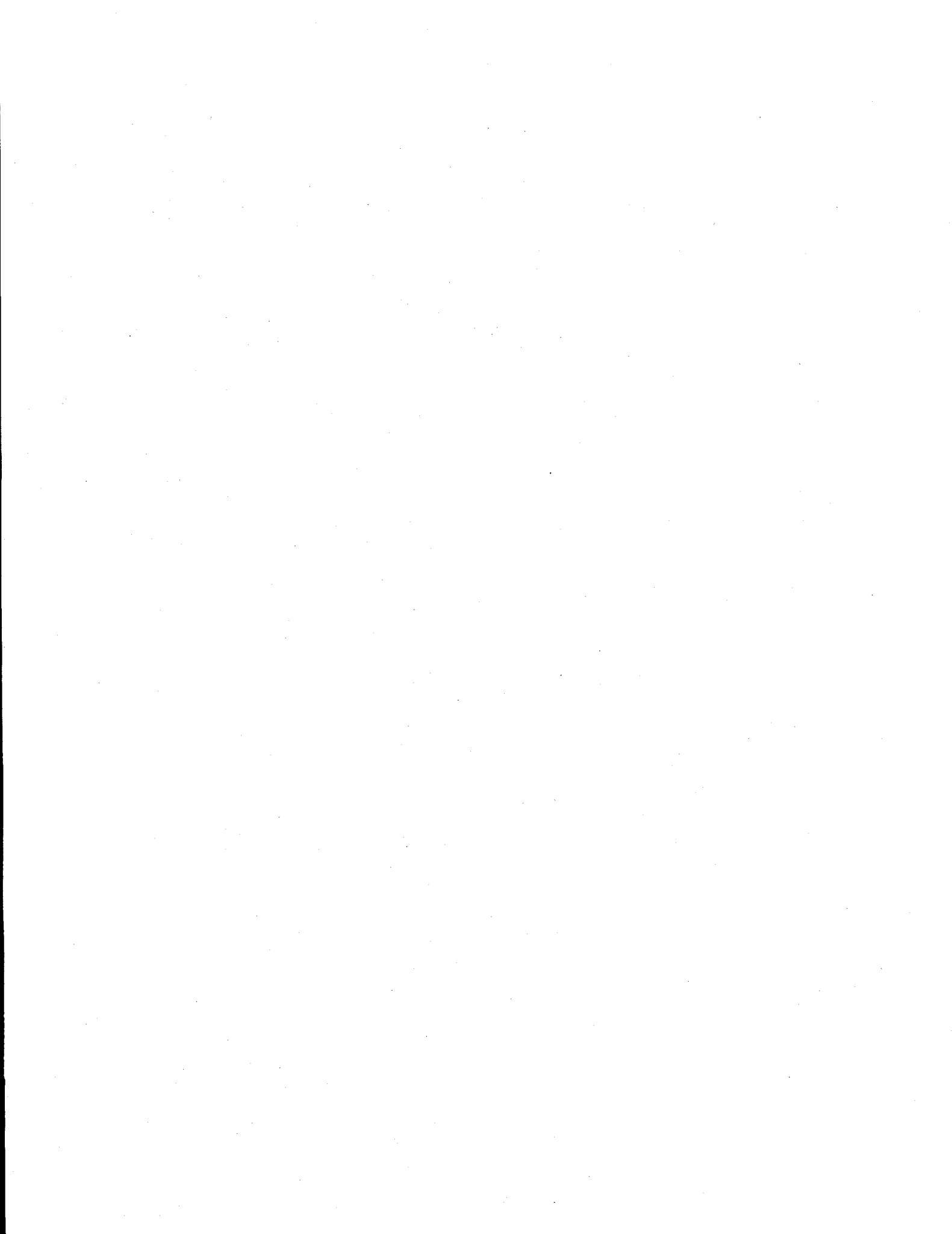
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## ABSTRACT

Nydal, R., A. L. Brenkert (ed.), and T. A. Boden (ed.). *Carbon-14 Measurements in Surface Water CO<sub>2</sub> from the Atlantic, Indian and Pacific Oceans, 1965–1994*. ORNL/CDIAC-104, NDP-057A. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA pp. 131.

In the 1960s, thermonuclear bomb tests released significant pulses of radioactive carbon-14 (<sup>14</sup>C) into the atmosphere. These major perturbations allowed scientists to study the dynamics of the global carbon cycle by calculating rates of isotopic exchange between the atmosphere and ocean waters. The Radiological Dating Laboratory at the Norwegian Institute of Technology performed <sup>14</sup>C measurements of atmospheric CO<sub>2</sub> from 1962 to 1993 at a network of ground stations in the northern and southern hemispheres; in addition it performed <sup>14</sup>C measurements at high-altitude (between 9-12.6 km) during 1965 (Nydal and Lövseth, 1983, 1996). The Norwegian Radiological Dating Laboratory performed similar measurements on seawater samples collected at the ocean surface from 1965 through 1994. The resulting <sup>14</sup>C ocean surface water database is documented here and is available from the Carbon Dioxide Information Analysis Center (CDIAC) as NDP-057A, free of charge.

The data from NDP-057A, coupled with other <sup>14</sup>C data sets, can lead to a greater understanding of the dynamic carbon reservoir and lead to a crude picture of anomalous sources and sinks at different geographical latitudes. The database is outstanding for its inclusion of early <sup>14</sup>C measurements, broad spatial coverage of sampling, relative consistency of sampling methods, and  $\Delta^{14}\text{C}$  calculation results corrected for isotopic fractionation and radioactive decay. This database replaces previous versions published by the author and the Radiological Dating Laboratory.

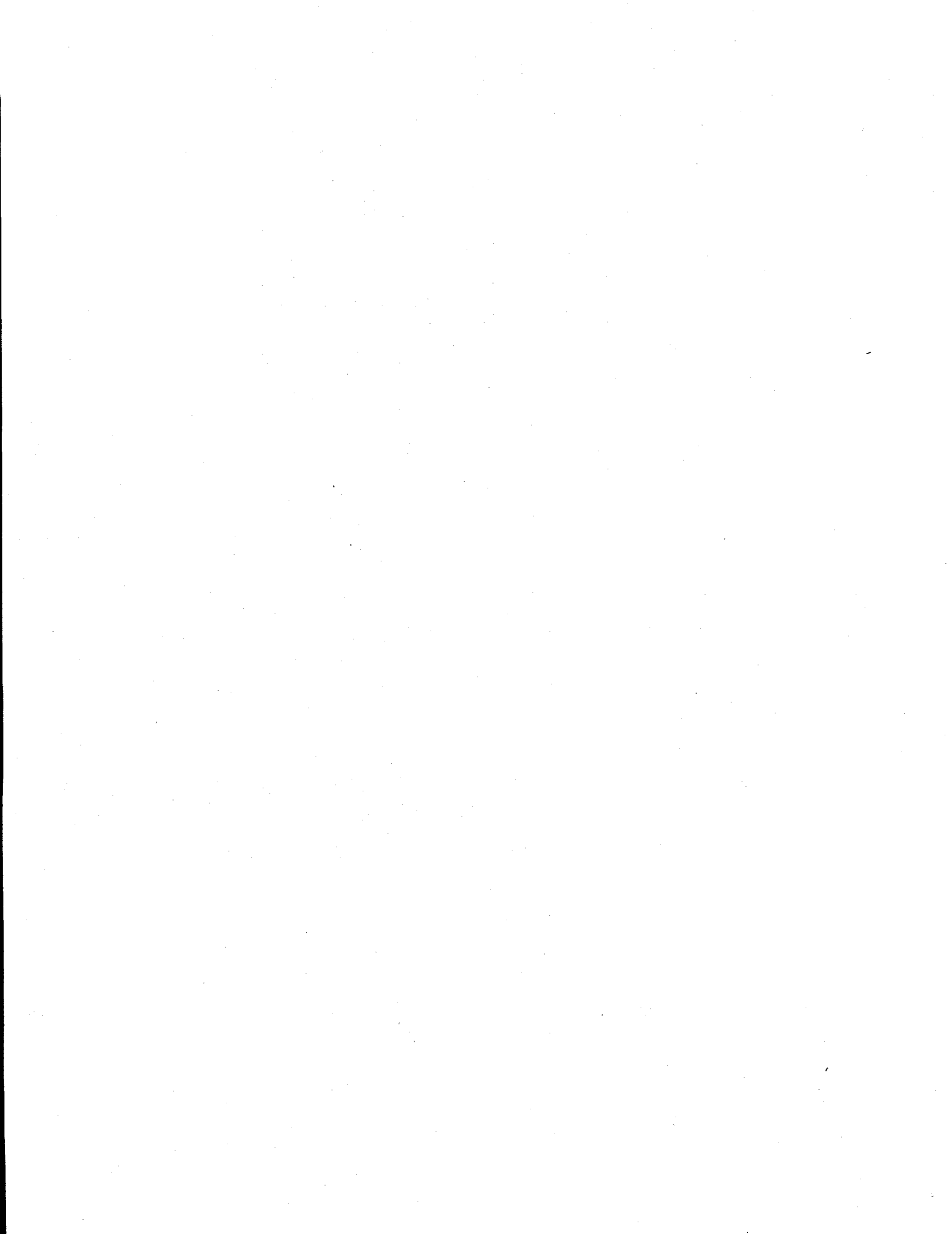
A total of 950 ocean surface water observations were made from 1965 through 1994. The measurements were taken at 30 stations in the Atlantic Ocean, 14 stations in the Indian Ocean, and 38 stations in the Pacific Ocean. Thirty-two of the 950 samples were taken in the Atlantic Ocean during the R/V *Andenes* research cruise. <sup>14</sup>C was measured in 871 of the 950 samples, and those measurements have been corrected ( $\Delta^{14}\text{C}$ ) for isotopic fractionation and radioactive decay. The  $\Delta^{14}\text{C}$  values range between -113.3 and 280.9 per mille and have a mean value of 101.3 per mille. The highest yearly mean (146.5 per mille) was calculated for 1969, the lowest yearly mean value was calculated for 1990 (67.9 per mille) illustrating a decrease over time. This decrease was to be expected as a result of the ban on atmospheric thermonuclear tests and the slow mixing of the ocean surface waters with the deeper layers. The range of  $\Delta^{14}\text{C}$  values is large and depends on where and when the sample was taken, i.e., upwelling areas, far northern or southern latitudes, near fresh water influxes, temperature, salinity. Besides the corrected <sup>14</sup>C data, the <sup>13</sup>C data used for correcting the <sup>14</sup>C data for fractionation are provided as are the temperature, salinity and depth measurements, and information on where and when the samples were taken. Data are plotted vs time and vs latitude with ocean designations to provide quick overviews of data patterns. The data are fully listed and are available as one file of around 0.08 megabytes. The format of the data file permits easy import into PC-based spreadsheet software like Microsoft Excel. Programs to read and print the data file (FORTRAN 77 and SAS®) are provided also.

SAS® is the registered trademark of the SAS Institute, Inc., Cary, North Carolina, 27511, USA.

Given the long period-of-record, this database may serve as a baseline for  $^{14}\text{C}$  measurements collected during more recent oceanographic cruises including the World Ocean Circulation Experiment (WOCE), Joint Global Ocean Flux Study (JGOFS), Transient Tracers in the Ocean program (TTO), South Atlantic Ventilation Experiment (SAVE) data, and the older Geochemical Ocean Sections Study (GEOSECS).

## **PART 1**

### **OVERVIEW**





## 1. NAME OF THE DATABASE AND DOCUMENTATION

Carbon-14 Measurements in Surface Water CO<sub>2</sub> from the Atlantic, Indian and Pacific Oceans, 1965–1994.

## 2. PRINCIPAL INVESTIGATOR

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## 3. KEYWORDS

Radiocarbon, <sup>14</sup>C, CO<sub>2</sub>, carbon isotopes, bomb <sup>14</sup>C, Δ<sup>14</sup>C, δ<sup>14</sup>C, δ<sup>13</sup>C, surface water, ocean

## 4. BACKGROUND INFORMATION

The carbon-14 radioisotope (<sup>14</sup>C) resulting from atmospheric nuclear bomb testing during the 1950s and 1960s can be used as a tracer to study carbon dioxide (CO<sub>2</sub>) exchange between the atmosphere, biosphere, and ocean. Natural atmospheric <sup>14</sup>C, occurring as <sup>14</sup>CO<sub>2</sub>, results from natural nuclear reactions between cosmic ray neutrons and atmospheric nitrogen. The natural equilibrium between the production and disintegration of <sup>14</sup>C (half-life of 5,730 ± 40 yrs) determines in part the existing natural background radiocarbon levels. The nuclear tests in the atmosphere, with a total strength of 430 megaton (TNT equivalent) in the period from 1945 to 1980, added dramatically to the presence of atmospheric <sup>14</sup>C (Nydal and Lövseth 1983, 1996). About two thirds of this yield was released by the Soviet Union in the stratosphere at high northern latitudes (e.g., Novaya Zemlya in

the former Soviet Union) in 1961 and 1962. A Test Ban Treaty, signed by the United States, the Soviet Union and Great Britain on August 5, 1963 ended atmospheric testing for these nations. France and China continued, however, with smaller fission bombs. France performed the last atmospheric test in September, 1974, and China in October, 1980 (Norris and Arkin 1994). Nuclear power reactors are another source, although minor (depending on the efficiency of the filtering system), of atmospheric  $^{14}\text{C}$  (Nydal et al. 1980). From 1962 through 1994, the Norwegian Radiological Dating Laboratory, under Dr. Reidar Nydal, conducted regular measurements of  $^{14}\text{C}$  in the atmosphere at ground level; in the lower stratosphere and in high altitudes using aircraft; and in the surface waters of the various oceans using research ships and ships of opportunity. Final results of the atmospheric measurements have been documented and archived at the Carbon Dioxide Information Analysis Center (CDIAC) at Oak Ridge National Laboratory (Nydal and Lövseth 1996). The previously published ocean data through 1981 (Nydal et al. 1979, Nydal et al. 1980, Nydal et al. 1984) have been updated and corrected for radioactive decay. The final version with data through 1994 is documented in this database (NDP-057A).

Sampling of the ocean surface waters for  $^{14}\text{C}$  was performed from cargo ships on their regular routes and from Norwegian research vessels. The Norwegian shipping companies Fred Olsen and Wilh. Wilhelmsen collected the samples on their ordinary routes through the Atlantic, Pacific and Indian Oceans. From 1965 until 1976 there were a large number of possible routes; about six ships were involved in the sampling. The sampling was shared between the two shipping companies in order to cover the main part of the world ocean surface between  $45^\circ\text{N}$  and  $45^\circ\text{S}$ . The ships crossed the Atlantic Ocean from Europe to North and South America, went along the African coast, passed through the Panama Canal to the Pacific Ocean to New Zealand, Australia, and Japan and returned either over the Indian Ocean and around the Cape of Africa or through the Suez Canal. Ships also sailed in the opposite direction, over the Indian Ocean to Australia before crossing the Pacific Ocean to Panama (Fig. 1).

Big changes occurred in the shipping routes after 1973. A few ships were then selected to cover most of the earlier established sampling locations. After 1986 sampling was reduced to only one ship from the Wilh. Wilhelmsen line. That ship (the *M/S Tourcoing*) was able to cover some of the previous sampling locations. Its main route led from Europe, across the Atlantic Ocean to Panama, across the Pacific to New Zealand and Australia, and north to Japan before returning through the North Pacific and Atlantic Ocean. Special cruises by Norwegian research vessels, the *M/S G.O. Sars*, *M/S Lance*, *M/S Mosby*, and *M/S Johan Hjort*, sampled the Nordic Seas from 1965 to 1967 and 1990 to 1992; the *R/V Andenes* sampled the Atlantic Ocean during a round-trip research cruise to Antarctica from 1989 to 1990. Table 1 provides an overview of when the particular ships were involved in sampling.

Samples taken through 1994 have been processed for this database. From all ships, a total of 950 observations were made from 1965–1994; of these a total of 871 observations of  $^{14}\text{C}$  have been corrected for fractionation and radioactive decay (see Sections 14 and 15).

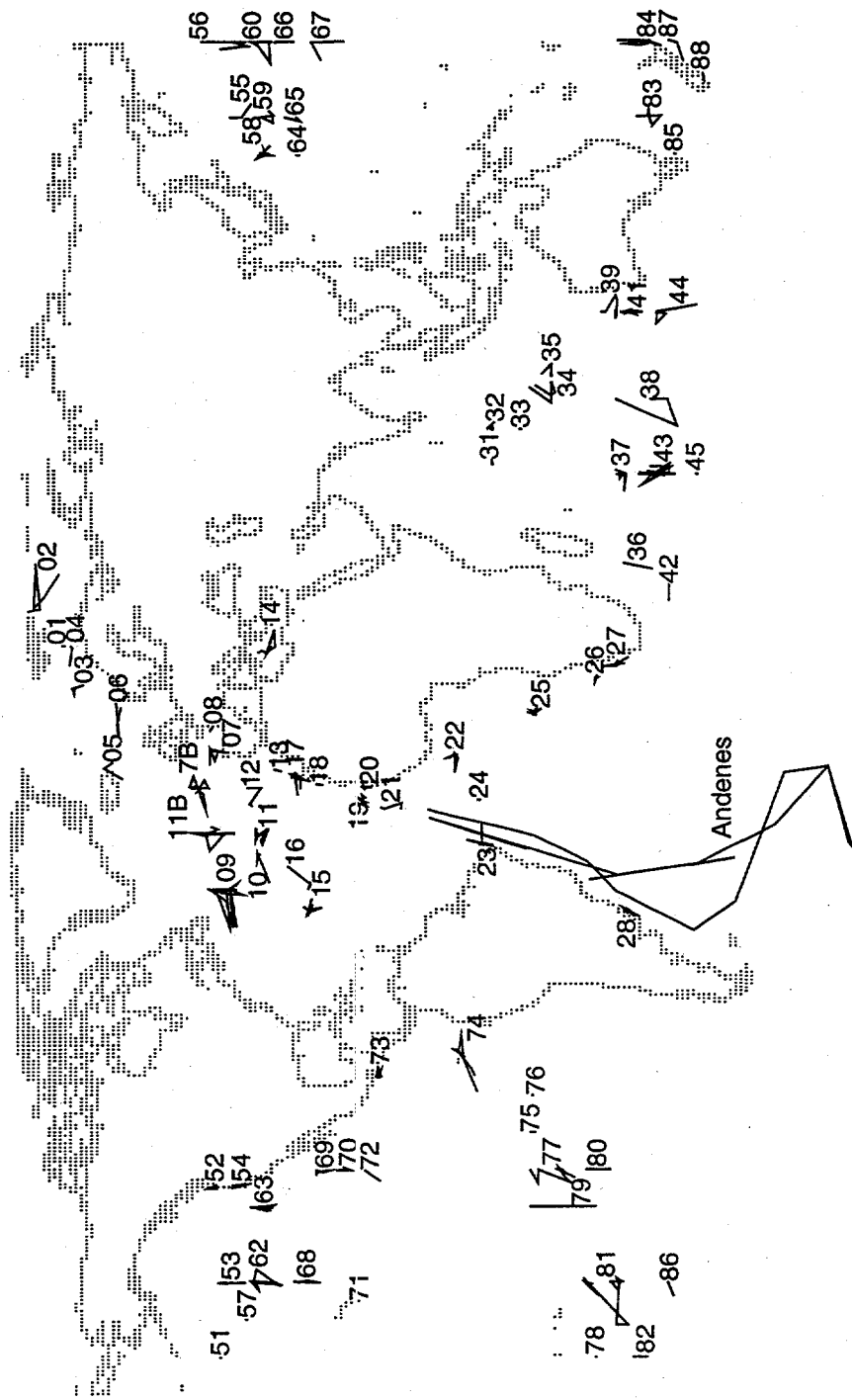


Figure 1. Station locations.

**Table 1. Sample identifications, ships involved and sampling period.**

Sample	(No. of samples)	Ship	Company	Period
SV1-286	(271)	Various ships	Fred Olsen &	1965-1972
		Various ships	Wilh. Wilhelmen	1966-1976
		Various vessels	Research vessels	1965-1967
TO1-33	(32)	M/S <i>Torrens</i>	Wilh. Wilhelmen	1976-1978
TR1-206	(168)	M/S <i>Tricolor</i>	Wilh. Wilhelmen	1976-1981
TB164-243	(71)	M/S <i>Tombarra</i>	Wilh. Wilhelmen	1980-1983
BT4-74	(57)	M/S <i>Barber Tønsberg</i>	Wilh. Wilhelmen	1983-1986
TQ245-594	(311)	M/S <i>Tourcoing</i>	Wilh. Wilhelmen	1983-1994
GS19	(1)	R/V <i>G.O. Sars</i>	Research vessel	1990
LA1-LA5	(5)	R/V <i>Lance</i>	Research vessel	1990
MO	(1)	R/V <i>Mosby</i>	Research vessel	1991
JH5	(1)	R/V <i>Johan Hjort</i>	Research vessel	1992
A01-16	(32)	R/V <i>Andenes</i>	Research vessel	1989-1990

Like  $^{14}\text{C}$ ,  $^{13}\text{C}$  is a carbon isotope found in the biosphere, atmosphere and hydrosphere. Unlike the radio-isotope  $^{14}\text{C}$ ,  $^{13}\text{C}$  is a stable isotope. Plants discriminate against  $^{13}\text{C}$  during photosynthesis, resulting in lower  $^{13}\text{C}/^{12}\text{C}$  ratios in plant-stored carbon compared to standard defined levels.  $\delta^{13}\text{C}$  values are deviations of the  $^{13}\text{C}/^{12}\text{C}$  ratio relative to the Pee Dee Belemite (PDB) (Pee Dee River, South Carolina, Craig 1961) standard. The isotopic fractionation caused by net photosynthesis causes increased atmospheric  $\delta^{13}\text{C}$  values ( $\delta^{13}\text{C}$  values for the biosphere and atmosphere of about -25 and -7.5 ‰ respectively; see also Quay et al. 1992, Broecker and Peng 1993). Dissolution of  $\text{CO}_2$  in the ocean involves a relatively small fractionation (Ciais et al., 1995). Fossil-fuel combustion, based on  $^{13}\text{C}$ -depleted plant materials, reverses the phenomenon of increased  $\delta^{13}\text{C}$  values in the atmosphere. Steady decreases over time in  $\delta^{13}\text{C}$  values have been measured in the atmosphere, oceans and ice-cores. Ciais et al. (1995) attempted to calculate the global partitioning of  $\text{CO}_2$  between the oceans and land, based on the atmospheric  $^{13}\text{C}/^{12}\text{C}$  ratio, as did others (Siegenthaler and Münnich 1981; Siegenthaler and Oeschler 1987; Quay et al. 1992)

Fossil fuels are devoid of  $^{14}\text{C}$  due to radioactive decay of  $^{14}\text{C}$  to  $^{14}\text{N}$ . Fossil-fuel combustion has thus resulted in reduced atmospheric and oceanic  $^{14}\text{C}/^{12}\text{C}$  ratios.  $\delta^{14}\text{C}$  values are deviations from the  $^{14}\text{C}/^{12}\text{C}$  ratio relative to the National Institute of Standard Technology (NIST) oxalic acid standard, that are not yet corrected for radioactive decay. Nydal et al. measured  $^{14}\text{C}$  and  $^{13}\text{C}$  such that the  $\delta^{14}\text{C}$  values and  $\delta^{13}\text{C}$  could be calculated and such that the  $\delta^{14}\text{C}$  values could be corrected for isotopic mass fractionation and for radioactive decay (see Section 6). Nydal considers the  $\delta^{13}\text{C}$  values in this database appropriate for the correction of the  $^{14}\text{C}$  measurements, but did not consider them representative of true ocean bicarbonate levels. In principal, changes both in  $\delta^{13}\text{C}$  and  $\delta^{14}\text{C}$  values can be used as tracers of  $\text{CO}_2$  fate over time (Nydal and Lövseth 1965; Nydal 1968; Nydal et al. 1980; Nydal and Lövseth 1983). Temperature, salinity, and sampling depth were measured for almost all sampling locations. Those data are incorporated in this database; they may aid in the interpretation of the variability of the radiocarbon data.

## 5. SAMPLING LOCATIONS AND IDENTIFICATION NUMBERS

In contrast to planned research cruises, locations for sampling with commercial ships were dependent on shipping routes (Fig. 1). In addition, weather situations caused changes in the routes throughout the year, making it difficult to return to the same position during subsequent cruises. After some time 'stations' (Table 2) were defined, containing one to any number of samples taken over time within a few degrees latitude and longitude (Nydal et al. 1984). Because of a large number of additional samples presented in this report, compared to the 1984 publication, it has been necessary to make slight changes to the earlier arrangement of the stations (compare Appendix B, and Table 7). Station size was probably not critical in the open ocean, but closer to the continents (e.g., West Africa) even small changes in the location may have had great influence on the  $^{14}\text{C}/^{12}\text{C}$  ratios.

At the beginning of the project, the sampling locations were chosen more or less arbitrarily at intervals of several degrees in order to cover the main ocean surface. Some of the sampling locations were not revisited after a short time, often due to changes in the shipping routes, but also in favor of more interesting locations. In some cases it was possible to establish stations where sampling was repeated during several years in each of the three oceans.

Various cargo ships (listed in Table 1) were involved in the collection of samples. Two ships, the *M/S Bolinas* and *M/S Bandairante* from the Fred Olsen Company covered most of the Atlantic for 10 years (1966-1972). Several ships (the *M/S Bolinas*, *M/S Bandairante*, *M/S Torrens*, *M/S Tiber*, *M/S Toledo*, *M/S Tungsha*, *M/S Tarn*, *M/S Taimyr*, *M/S Trinidad*, and *M/S Tricolor*) from the Fred Olsen Company and from Wilh. Wilhelmsen (Barber International) covered parts of the Atlantic, Pacific and Indian Ocean during the same period. From 1966 until 1976 the seawater collected (in 200-liter barrels) was transported to the laboratory for further processing after two to four months of storage. The running sample identification numbers SV1-SV286 were assigned to the samples from this period. After the reorganization of the sampling program in 1976 it was found more convenient to have the sample numbers connected to each ship (*M/S Torrens*, *M/S Barber Tønsberg*, *M/S Tricolor*, *M/S Tombarra*, *M/S Tourcoing*) because the flushing procedure for  $\text{CO}_2$  collection was performed by the staff (the chief) on board the ships (see Section 6).

The Atlantic Ocean was covered with 30 stations (S01-S28, S07B, and S11B) from the Barentz Sea ( $74^\circ$  N) to the South Atlantic ( $35^\circ$  S). One of the sampling stations is located in the Mediterranean Sea (Station 14). Measurements from these 30 stations were complemented with measurements from a special sampling series on an Antarctic cruise by the Norwegian research vessel *Andenes* (An0), sailing between 1989 and 1990. Thirty-two samples were collected on that cruise in the region from  $45^\circ 03'$  N,  $8^\circ$  W to  $73^\circ 58'$  S,  $56^\circ$  W (see also Nydal and Gislefoss 1996). Twenty-two of these samples are listed under Station An0; the other ten sampling locations were added to the appropriate Atlantic Ocean stations, namely, A-00001# and A-00001(2) to Station 7, A-00002 and A-00002(2) to Station 17, A-00003 and A-00003(2) to Station 19, A-00004 and A-00004(2) to Station 21, and A-00007 and A-00007(2) to Station 23 (see also Section 14); the remaining data are listed under Station An0.

The locations for each Atlantic Ocean station, the number of samples, and the sampling periods are summarized in Table 2.

**Table 2. Sample stations and collection dates from the Atlantic Ocean.**

Station	No. of Samples	Date of collection	Approximate location
An0	22 <sup>1</sup>	1989-1990	6°N-75° S, 12°-57° W
S01	1	6/2/1966	74°14° N, 20°11° E
S02	6	1965 (1) and 1990 (5)	74°-81° N, 29°-42° E
S03	4	1966-1967 (3) and 1990 (1)	69°-72° N, 07°-10° E
S04	4	1965-1967	72°-73° N, 14°-21° E
S05	3	1965-1966 (2) and 1991 (1)	62°-66° N, 11°-16° W
S06	5	1965-1967 (4) and 1992 (1)	63°-64° N, 05° E-04° W
S07	23	1966-1967 (2) and 1976-1990 (21)	42°-46° N, 07°-12° W
S07B	22	1985-1994	46°-50° N, 14°-24° W
S08	6	1977-1981	45°-46° N, 01°-03° W
S09	33	1984-1994	39°-47° N, 43°-55° W
S10	4	1969-1970	34°-38° N, 35°-44° W
S11	10	1966-1970 (9) and 1983 (1)	35°-38° N, 28°-33° W
S11B	24	1984-1994	41°-49° N, 28°-35° W
S12	7	1968-1970 (2) and 1983-1986 (5)	36°-40° N, 18°-23° W
S13	2	1967-1968	32°-34° N, 13°-13°30' W
S14	18	1979-1986	33°-38° N, 17°-25° E
S15	12	1966-1977	25°-29° N, 47°-53° W
S16	4	1966-1969	27°-32° N, 39°-46° W
S17	65	1966-1990	27°-31° N, 13°-20° W
S18	2	1966-1967	24°-27° N, 17° W
S19	24	1966-1972 (22) and 1989-1990 (2)	16°-19° N, 20°-23° W
S20	39	1976-1990	15°-18° N, 17°-19° W
S21	4	1967 (2) and 1989-1990 (2)	10°-14° N, 22°-24° W
S22	43	1976-1990	01° S-02° N, 08°-14° W
S23	25	1966-1972 (23) and 1989-1990 (2)	02°-08° S, 27°-34° W
S24	1	11/30/1967	04°50' S, 21°20' W
S25	46	1976-1990	13°-17° S, 01°-03° E
S26	5	1977-1978	25°-27° S, 10°-12° E
S27	40	1976-1990	29°-31° S, 14°-17° E
S28	20	1967-1972	31°-35° S, 50°-53° W

In brief, the Atlantic component of this database offers one time series spanning 25 years (1966-1990) with 65 samples (S17) for the coast of Africa; 15-year time series between 1976 and 1990 for S07, S20, S22, S25 and S27; 8-10 year time series for S11B, S09, and S07B; and an 8-year

<sup>1</sup>The R/V *Andenes* research cruise sampled 16 locations on a trip back and forth to the Antarctic for a total of 32 samples; ten of these samples were merged with existing stations; the remaining 22 samples are listed under An0.

time series for the station in the Mediterranean Sea (Figs. A-1 thru A-10). Other station records are generally less than 8 years and are not plotted as individual time-series.

The Indian Ocean component of this database contains measurements from 14 stations (S31-S45, S40 is listed under S43) mainly from the open ocean between 7° S and 45° S (Table 3). The samples were collected on cruises between Australia and the Cape of Africa or the Red Sea. All stations in the Indian Ocean were situated on the deep basins with depths greater than 3000 meters.

**Table 3. Sample stations and collection dates from the Indian Ocean.**

Station	No. of Samples	Date of collection	Approximate location
S31	3	1978-1981	06°-07° S, 67°-69° E
S32	11	1977-1984	06°-08° S, 76°-79° E
S33	1	11-3-1977	12°29' S, 77° E
S34	7	1976-1984	13°-19° S, 84°-90° E
S35	10	1976-1984	16°-19° S, 91°-95° E
S36	3	1977 (1) and 1990 (2)	31°-37° S, 40°-42° E
S37	15	1977-1985	30°-32° S, 60°-67° E
S38	5	1977 (1) and 1984-1991 (40)	30°-42° S, 77°-85° E
S39	12	1976-1984	27°-31° S, 106°-113° E
S41	18	1979-1991	31°-36° S, 107°-109° E
S42	2	1977-1979	40° S, 31°-36° E
S43	28	1976-1991	34°-42° S, 62°-68° E
S44	8	1977-1986	37°-46° S, 105°-110° E
S45	1	1/10/1979	45° S, 65° E

The measurements in the Indian Ocean offer records spanning 12-15 years for stations S41 and S43 and 8-10 years for stations S32, S34, S37, S39, and S44 (Figs. A-11 thru A-15). Records from other stations have shorter durations.

The Pacific Ocean component of this database consists of 38 stations (S51-S88, S61 was combined with S60). These stations were located mainly between North America and Japan in the northern hemisphere, and between Panama and Australia in the southern hemisphere (Table 4). Normally, sample collection took place when crossing certain longitudes. The majority of the stations were located in calmer surface layer from 15° N to 35° N and 15° S to 35° S. Frequent changes in shipping routes, due to the weather changes between summer and winter, caused a scattering of the stations in the longitudinal direction.

**Table 4. Sample stations and collection dates from the Pacific Ocean.**

Station	No. of Samples	Date of collection	Approximate location
S51	1	4/13/1970	44°22' N, 170° W
S52	11	1966-1970	44°-47° N, 123°-125° W
S53	12	1970 (1) and 1984-1994 (11)	39°-45° N, 150° W
S54	3	1969-1970	38°-42° N, 123°-125° W
S55	6	1970-1973 (2) and 1988-1993 (4)	38°-43° N, 164° E
S56	18	1970-1973 (3) and 1983-1994 (15)	39°-48° N, 178° W-178° E
S57	1	7/27/1971	39°35' N, 160° W
S58	13	1971 (1) and 1983-1992 (12)	34°-37° N, 149°-153° E
S59	10	1973-1974 (3) and 1987-1994 (7)	34°-37° N, 158°-162° E
S60	13	1974-1975 (2) and 1985-1994 (11)	34°-39° N, 179° E-179° W
S62	17	1973-1975 (5) and 1983-1993 (12)	32°-39° N, 146°-152° W
S63	20	1970 (1) and 1983-1994 (19)	34°-39° N, 129°-131° W
S64	1	10/24/1973	29°46' N, 150° E
S65	4	1971-1973	29°-32° N, 159°-160° E
S66	4	1973 (3) and 1991 (1)	30°-34° N, 179°-180° E
S67	3	1971-1972	20°-27° N, 179° W-175° E
S68	5	1970-1973 (4) and 1994 (1)	25°-31° N, 149°-150° W
S69	6	1973-1975	23°-27° N, 120°-122° W
S70	5	1970-1972	19°-23° N, 119°-120° W
S71	1	3-21-1972	18° N, 155° W
S72	2	1972-1973	14°-17° N, 120°-123° W
S73	20	1966-1970 (13) and 1984-1986 (7)	13°-15° N, 92°-96° W
S74	11	1971 (1) and 1989-1994 (10)	0°-04° S, 84°-100° W
S75	5	1970-1972	13°-15° S, 110° W
S76	1	6/13/1977	14°39' S, 100° W
S77	21	1973-1977 (7) and 1987-1994 (14)	13°-23° S, 119°-124° W
S78	1	11/28/1970	26°05' S, 170° W
S79	5	1970-1972	13°-27° S, 130° W
S80	4	1971-1977 (3) and 1988 (1)	24°-29° S, 120° W
S81	25	1970-1975(11) and 1987-1994 (14)	23°-32° S, 149°-162° W
S82	4	1970-1972	33°-36° S, 170° W
S83	17	1976 (2) and 1986-1994 (15)	33°-39° S, 157°-162° E
S84	21	1971-1976 (8) and 1987-1994 (13)	30°-39° S, 178° W-178° E
S85	1	10-5-1975	41°27' S, 150° E
S86	2	1976-1977	39°-41° S, 150°-154° W
S87	3	1973 (2) and 1976 (1)	39°-43° S, 174°-180° E
S88	5	1973-1975	46°-47° S, 168°-172° E



Measurements in the Pacific Ocean were less systematic than in the other oceans. Shipping route changes in the 1970s had great influence on the consistency of the measurements. Sampling was mainly performed in the periods 1966 to 1975 and 1983 to 1994. Station locations were mostly scattered in the first period, and the maximum length of any record was only 4-5 years (S52, S73, S77, S81, and S84). Greater sampling consistency was obtained in the second period, with records spanning 6-10 years at some stations (S53, S56, S58, S59, S63, S77, S81, S83, and S84) (Figs. A.16-A.24).

## 6. SAMPLE COLLECTION, MEASUREMENT TECHNIQUES, AND CORRECTION CALCULATIONS

For conventional  $^{14}\text{C}$  measurements, a  $\text{CO}_2$  volume of about 5 liters was needed, for which about 200 liters of seawater had to be collected. The seawater was collected through the inlet of the ship's cooling system and stored in cleaned steel 200-liter barrels. Temperatures and sampling depths were recorded at the time of sample collection. The air in the 200-liter barrels was removed by nitrogen flushing before filling. Subsequent treatment of the samples changed with time. During the first 10 years (1965-1976) the barrels were stored aboard the ships during the cruises, and processed 2-4 months later in the laboratory. After acidifying the seawater (to  $\text{pH} < 3$ ) with concentrated sulfuric acid, the  $\text{CO}_2$  was flushed out with nitrogen and adsorbed in ammonia (later to 2% 0.75 L NaOH). Flushing times varied between one and two days, and in general a 5-6 liter volume of clean  $\text{CO}_2$  gas was obtained after further precipitation with  $\text{CaCl}_2$ , filtration of  $\text{CaCO}_3$  and further treatment with HCl (later with  $\text{H}_3\text{PO}_4$ ).

In 1976 the sampling program was revised to eliminate the long storage of seawater in the large barrels on board the ship and the subsequent transport to the laboratory. Between 1976 and 1983 the flushing of  $\text{CO}_2$  was performed more systematically, i.e., the samples were flushed immediately after collection for 1.5 hours with 600 liters of pure nitrogen and adsorbed to 2% NaOH (0.75 L) on board the ship just after collection (Nydal et al. 1980, Nydal et al. 1984). Four to five liters of  $\text{CO}_2$  were still obtained. The revised procedure made it possible to collect and handle more samples on each cruise. When the samples (in NaOH solution) were received in the laboratory they were directly treated with acid in a vacuum system for further  $\text{CO}_2$  release. After 1983 the flushing of  $\text{CO}_2$  was again revised: a circulation pump on top of the barrel circulated excess nitrogen through the barrel resulting in a more complete extraction of  $\text{CO}_2$  from seawater within 2.5 hours.

$\delta^{13}\text{C}$ .  $^{13}\text{C}/^{12}\text{C}$  ratios were measured by mass spectrometry. The  $\delta^{13}\text{C}$  values (the deviation in the  $^{13}\text{C}/^{12}\text{C}$  ratio relative to the PDB standard) obtained during these measurements are relative values and are not representative of ocean bicarbonate values, mainly because of the storage (biological activity) of the seawater and the variable flushing procedures. Correct  $\delta^{13}\text{C}$  values for ocean bicarbonate can only be obtained after complete extraction of  $\text{CO}_2$  in a sample, and before any exchange between organic and dissolved inorganic carbon occurs.  $^{14}\text{C}$  measurements were the focus of the present work, and satisfactory precautions for representative  $\delta^{13}\text{C}$  measurements were not taken. When  $\text{CO}_2$  is only partially removed, the gas is enriched in  $^{12}\text{C}$  and a negative  $\delta^{13}\text{C}$  value is

obtained. The large range (from positive to negative values) of  $\delta^{13}\text{C}$  values can thus be explained. Most of the  $\delta^{13}\text{C}$  values for 1965–1976 ranged between 0 and 3 per mille (‰) and were fairly close to actual ocean bicarbonate values. There are, however, also some highly variable results with extreme values above 20 ‰. In the latter cases it can be assumed that leakage in the flushing system had occurred and that the result was enriched  $^{13}\text{CO}_2$ . It seems unlikely, however, that the  $^{14}\text{C}$  values (after correction) were affected because of excess pressure in the flushing system. After 1976 and up to 1983 a less complete flushing (reduced time) on board the ship resulted in general in negative  $\delta^{13}\text{C}$  values, i.e., a mean  $\delta^{13}\text{C}$  value of - 6.5 ‰. Deviation in  $\delta^{13}\text{C}$  from the normal ocean value varied, depending on how complete  $\text{CO}_2$  was extracted from the seawater. After 1983, the circulation pump proved to result in more complete extraction of the  $\text{CO}_2$  and the  $\delta^{13}\text{C}$  values showed more typical ocean bicarbonate values.

**$^{14}\text{C}$  measurements.**  $^{14}\text{C}$  was analyzed in  $\text{CO}_2$  proportional counters with gas volumes of 1-2 L under 2 atm pressure, similar to the atmospheric  $\text{CO}_2$  measurements (Nydal et al. 1983, Nydal et al. 1984, Nydal and Lövseth 1996). Until 1976 the samples were measured with an accuracy of about 10 ‰ during counting time of 24 hours. Afterwards, in order to obtain higher precision (5-7 ‰), counting times were increased upwards to 4 days.

After determination of the  $^{14}\text{C}$  content, the  $\delta^{14}\text{C}$  values (the deviation in the  $^{14}\text{C}/^{12}\text{C}$  ratio relative to a standard) were calculated as per mille excess above the normal  $^{14}\text{C}$  level defined by the US NIST oxalic acid standard. The ocean  $^{14}\text{C}$  content is finally expressed as  $\Delta^{14}\text{C}$ , which is the relative deviation of the measured  $^{14}\text{C}$  activity from the NIST oxalic acid standard activity, after correction for isotopic mass fractionation and radioactive decay related to age (Stuiver and Polach 1977).  $\Delta^{14}\text{C}$  is expressed in per mille (not as a percentage) and calculated using the following two steps:

$$\Delta^{14} = \delta^{14}\text{C} - 2(\delta^{13}\text{C} + 25)(1 + \delta^{14}\text{C}/1000) \quad (1)$$

$$\Delta^{14}\text{C} = \Delta^{14} + 1000(e^{\lambda(1950-t)} - 1) \quad (2)$$

In step 1, the  $^{14}\text{C}$  excess ( $\Delta^{14}$ ) is only corrected for isotopic mass fractionation.  $\delta^{14}\text{C}$  represents the uncorrected (for decay)  $^{14}\text{C}$  relative to the NIST standard and  $\delta^{13}\text{C}$  represents the deviation in the  $^{13}\text{C}/^{12}\text{C}$  ratio relative to the PDB standard. The  $^{13}\text{C}/^{12}\text{C}$  ratio was measured by mass spectrometry. The  $\delta^{13}\text{C}$  values, by themselves, represent data that are highly influenced by fractionation in the flushing process. In the earlier presentation of the  $^{14}\text{C}$  data from the Radiological Dating Laboratory only step 1 was used, and the decay of the NIST  $^{14}\text{C}$  reference standard after 1950 was not taken into account (Nydal et al. 1983). Applying the approximate formula in step 2, where  $\lambda$  is  $1/8267$  years ( $T/\ln 2$  where  $T$  is the 5730 year half-life of  $^{14}\text{C}$ ) and  $t$  is the year of sampling, this small decay (2-5 per mille) has now been applied to all the  $\Delta^{14}\text{C}$  data appearing in this database.

Negative values were occasionally obtained in the Arctic and Antarctic (Figs. 2, 3, and 4). These values can be explained by the more rapid vertical exchange of deep water in the Arctic and Antarctic. Before the nuclear bomb testing all values in the ocean were negative due to the mean age of the ocean carbon being ca. 500 years.

**Temperature.** The seawater temperature was measured where the samples were taken using an automatic recorder at the inlet of the ship's water-cooling system. The accuracy of this temperature-recorder was generally better than 0.5°C. Control measurements of the temperature were also performed with a thermometer in the barrel at the end of the filling process.

**Salinity.** Normally, one liter of seawater was put aside for salinity measurements from each sample. Salinity measurements were performed at 22.5°C with an Inductor Salinometer at the Marine Biological Station in Trondheim. The salinity measure is presented here in units of the practical salinity scale (pss) following the National and International Ocean Organizations' directives. This scale is defined as a conductivity ratio without unit. This salinity standard is in agreement with previously published salinity numbers given in per mille units. The limit of error (1 sigma=0.003 pss) in each case is certainly small compared to the error associated with the storage of the samples. The samples collected before 1976 were often stored several years before measurements. Some extreme deviations in salinity may be due to bottle leaks during storage. After 1976 the salinity measurements became more regular, but storage time was often still longer than 3 to 4 months. In spite of the relatively poor quality of the salinity measurements, they still offer some information about the stability of the water masses in the open ocean and along the continents. The measurements are especially important for revealing the intrusion of freshwater from rivers (e.g. at the coast of Argentina and at Washington, USA).

**Depth.** Depth values are equivalent to the depth of the inlet on the ship's water-cooling system where the 200-liter samples were collected. Depth values ranged between 2.5 and 11 meters. Sample LA2-0002A from Station 2 has a depth of 50 m because the surface sample had been lost. That sample belongs to a  $\Delta^{14}\text{C}$  depth profile in the Barentz Sea that showed small variations in  $^{14}\text{C}$  all the way down to the sea bottom.

For a further discussion of the sampling methods and each sampling site, please see the reprint of Nydal et al. (1984) in Appendix B.

## 7. RESULTS AND APPLICATIONS OF THE DATA

The ocean surface water  $^{14}\text{C}$  measurements documented in this NDP-057A and the atmospheric  $^{14}\text{C}$  measurements documented in NDP-057, coupled with other  $^{14}\text{C}$  data sets, can lead to a greater understanding of the dynamic carbon reservoir and lead to a crude picture of carbon fluxes at different geographical latitudes. The database is outstanding for its inclusion of early  $^{14}\text{C}$  measurements, broad spatial coverage of sampling, relative consistency of sampling method, and  $\Delta^{14}\text{C}$  calculation results corrected for isotopic fractionation and radioactive decay. This ocean  $^{14}\text{C}$  database replaces previous versions published by the authors and the Norwegian Radiological Dating Laboratory. Given the long period-of-record, the ocean surface water  $^{14}\text{C}$  data may be compared to the data obtained from more recent oceanographic cruises including the World Ocean Circulation Experiment (WOCE), Joint Global Ocean Flux Study (JGOFS), Transient Tracers in the Ocean

program (TTO), South Atlantic Ventilation Experiment (SAVE), and the older Geochemical Ocean Sections Study (GEOSECS).

$\Delta^{14}\text{C}$ , temperature and salinity data from those stations sampled multiple times over the 1965 to 1994 period were plotted (Figs. A.1-A.26) as mentioned before. As a brief overview of all data, we also plotted all  $\Delta^{14}\text{C}$  values,  $\delta^{13}\text{C}$  values, temperatures, and salinities vs time and vs latitude (Figs. 2-9). Figure 2 includes the atmospheric  $\Delta^{14}\text{C}$  data from NDP-057, the ocean surface water  $\Delta^{14}\text{C}$  data obtained from GEOSECS (Östlund and Stuiver, 1988, NDP-027), and  $\Delta^{14}\text{C}$  data from the WOCE section P17C in the equatorial Pacific Ocean (Goyet et al. 1997, NDP-062). Analogous to the atmospheric  $\Delta^{14}\text{C}$  data, but not to the same degree do we find, with time, a decline in the surface water  $\Delta^{14}\text{C}$  values indicating the slow mixing of the surface ocean water with the deeper layers. The scatter in the ocean surface  $\Delta^{14}\text{C}$  data is largely due to the fact that the data plotted are from a large variety of locations, differing in upwelling aspects, temperature, salinity, latitude, etc. Figures 3 and 4 show only the NDP-057A ocean water surface  $\Delta^{14}\text{C}$  data with ocean-specific symbols plotted vs time and vs latitude, respectively. The  $\Delta^{14}\text{C}$  latitudinal plot shows clearly that lower values were measured around the equator caused by upwelling of deeper, older ocean waters around the equator (see also Stuiver and Östlund, 1983). Near the Antarctic, deep mixing with cold centuries-old water that lacks  $^{14}\text{C}$  results in the negative  $\Delta^{14}\text{C}$  values. Figure 5 shows the oceanic (this NDP057A) and atmospheric (NDP057)  $\delta^{13}\text{C}$  values over time. The paragraph on  $\delta^{13}\text{C}$  values in the previous section (pp.11 and 12) explains the ocean  $\delta^{13}\text{C}$  values in Figure 5, i.e., the effects of the changes in flushing times. Figures 6 through 9 plot temperature and salinity vs time and vs latitude. The latitudinal temperature plot shows an expected pattern of warm temperatures between  $23^\circ\text{N}$  and  $23^\circ\text{S}$ . The highest salinity values are found in the North Atlantic Ocean in the early 1980s.

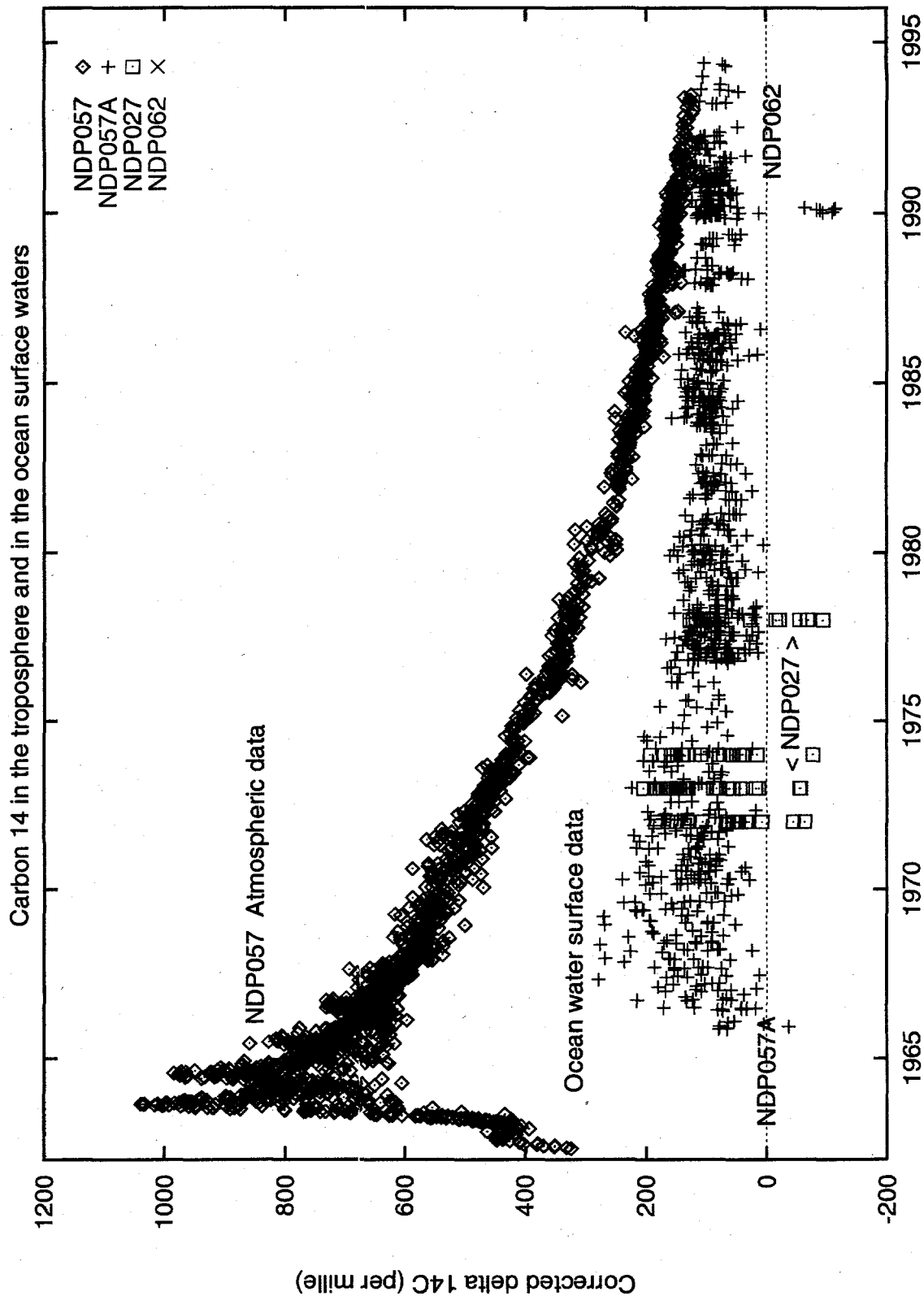


Figure 2. Atmospheric and oceanic corrected <sup>14</sup>C measurements over time.

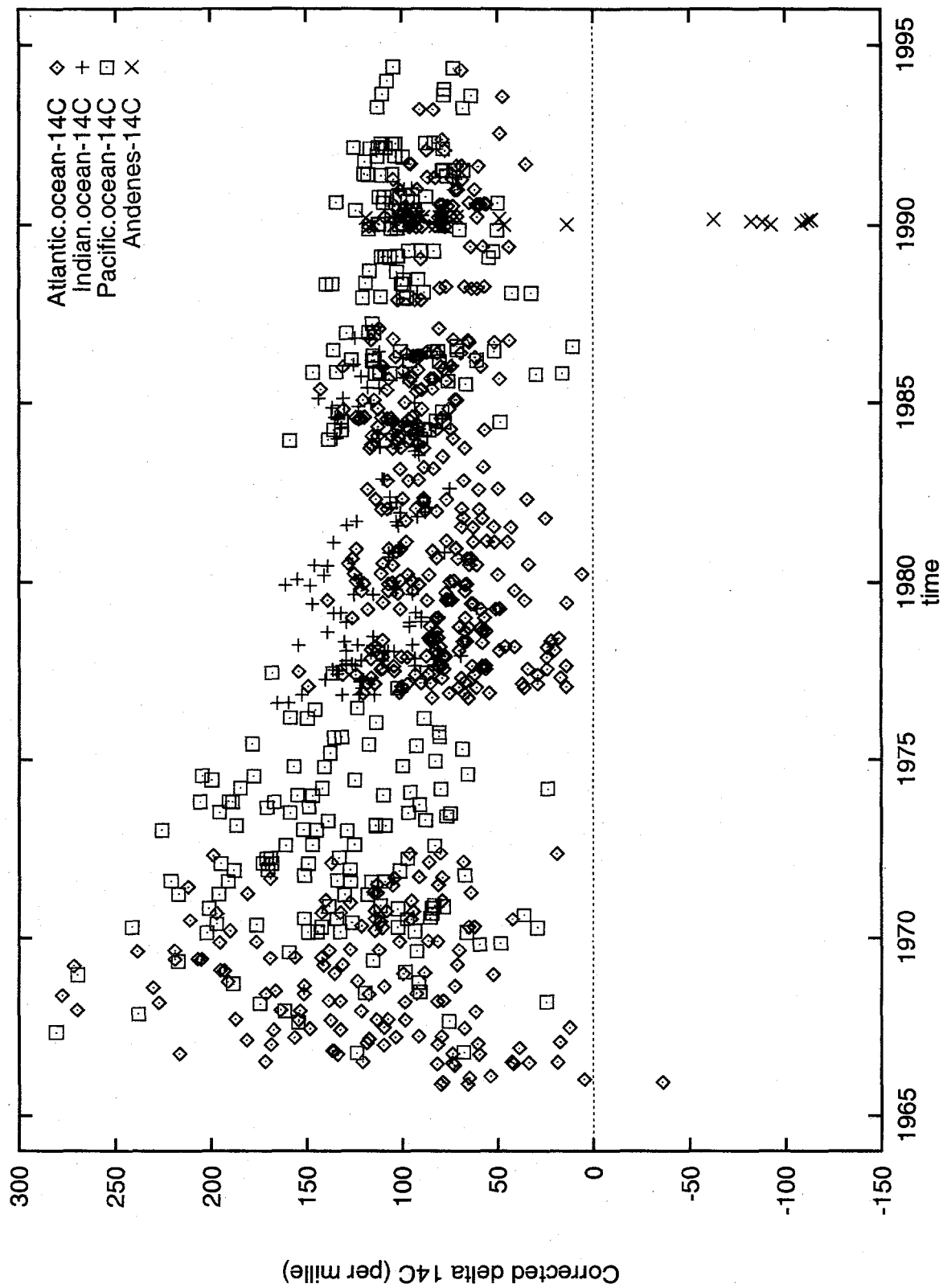


Figure 3. Corrected  $^{14}\text{C}$  measurements over time.

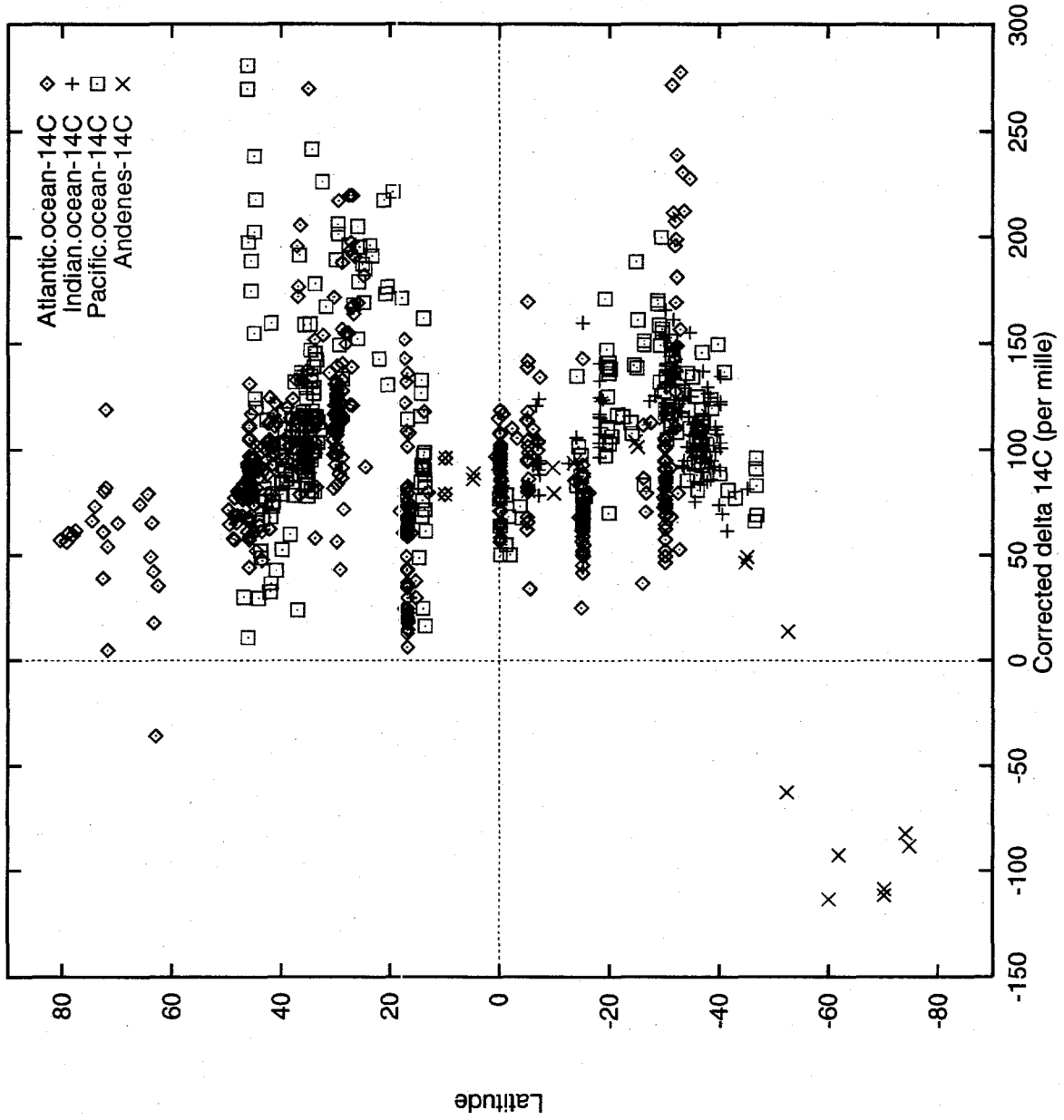


Figure 4. Corrected <sup>14</sup>C measurements by latitude.

Carbon-13 in the ocean surface waters and troposphere

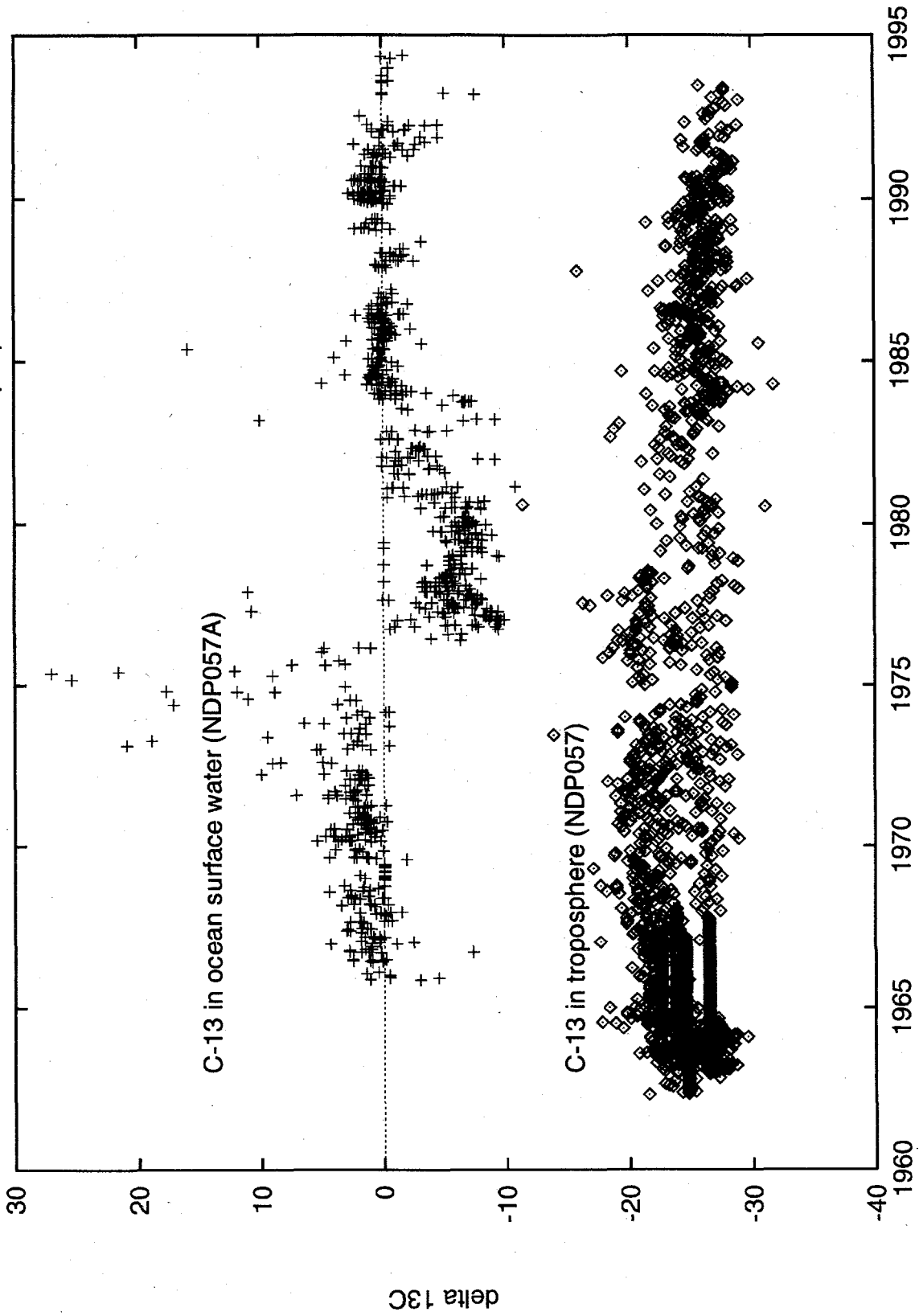


Figure 5. Oceanic and atmospheric  $\delta^{13}\text{C}$  measurements.



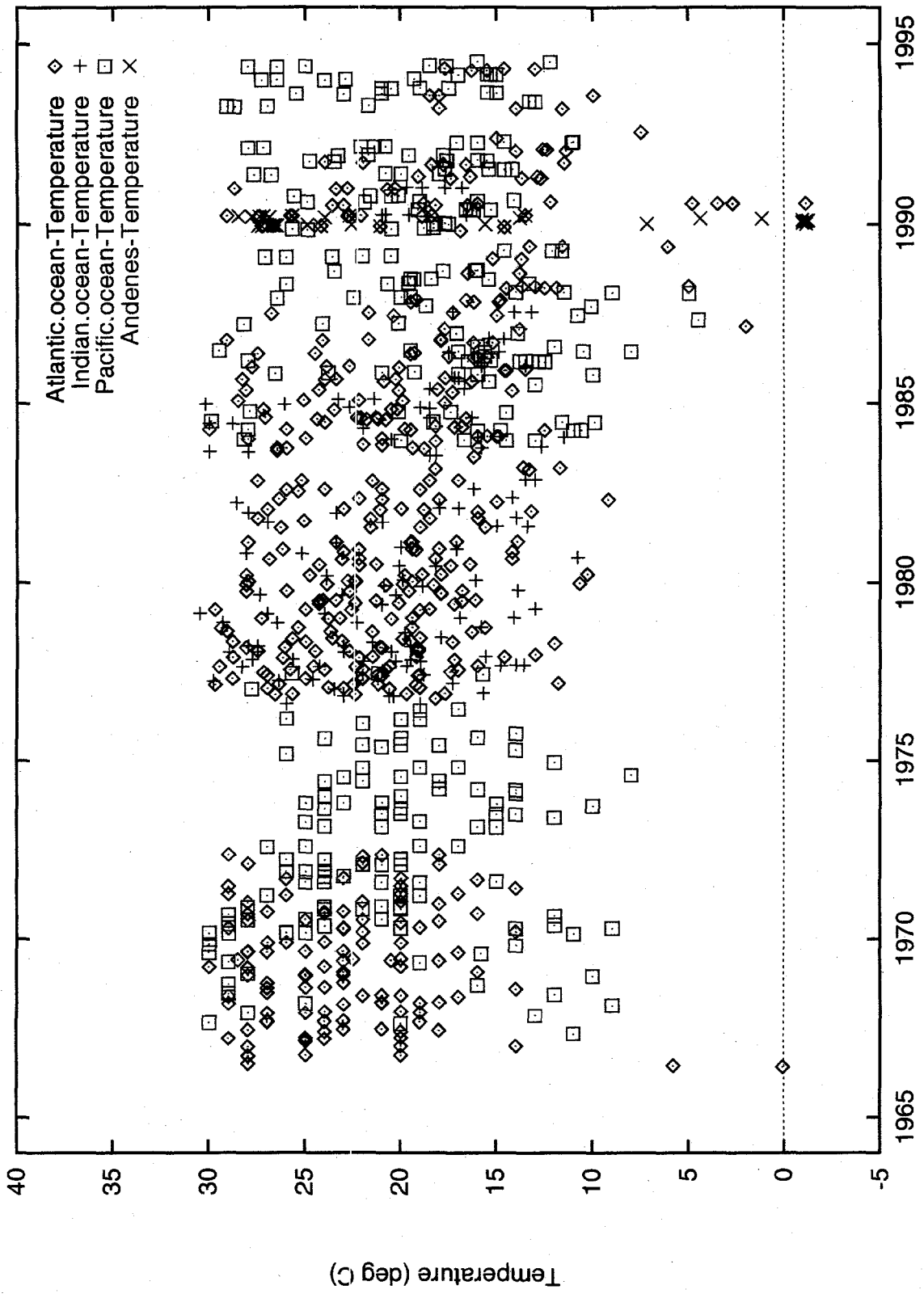


Figure 6. Temperature data over time.

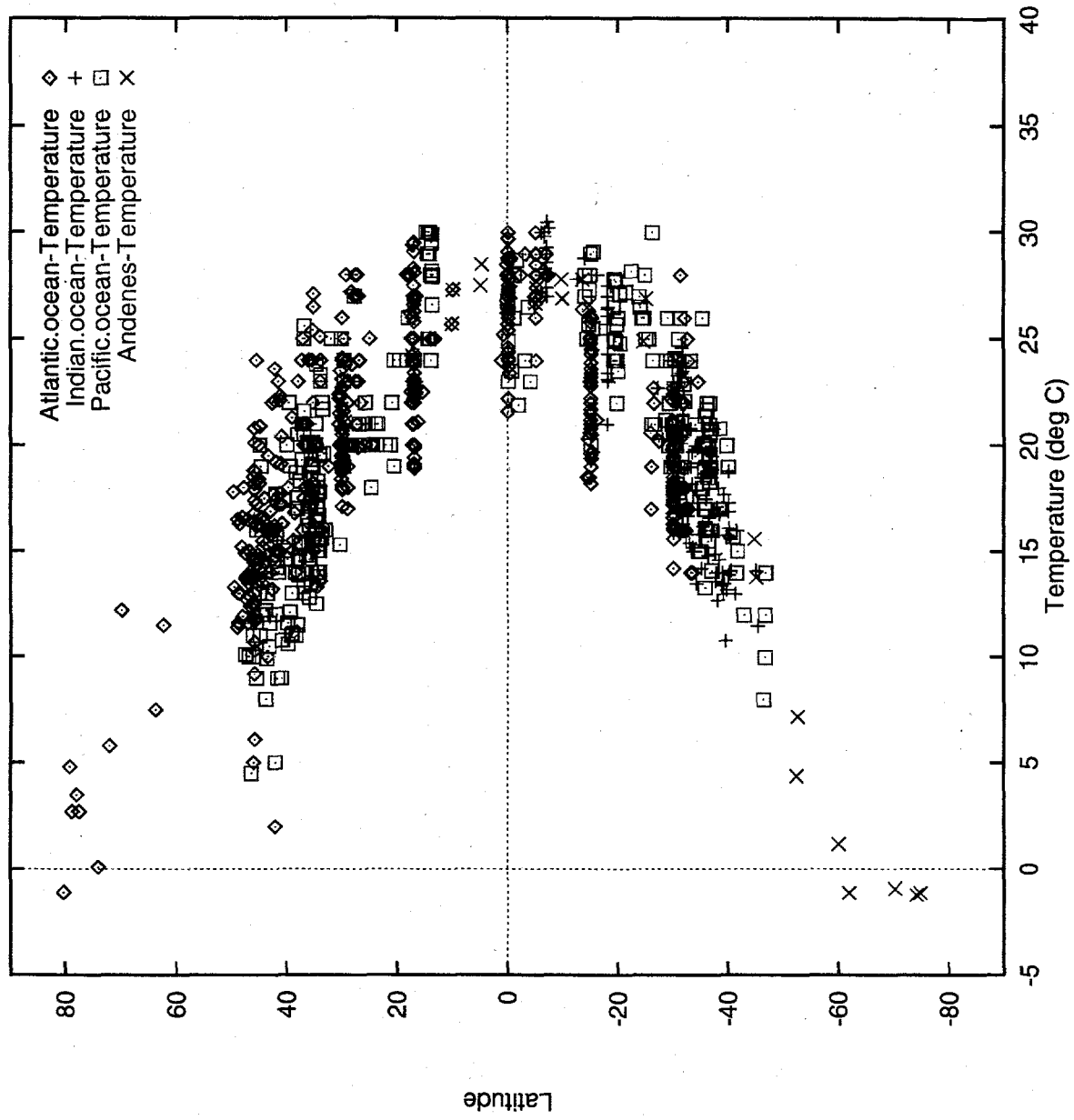


Figure 7. Temperature data by latitude.

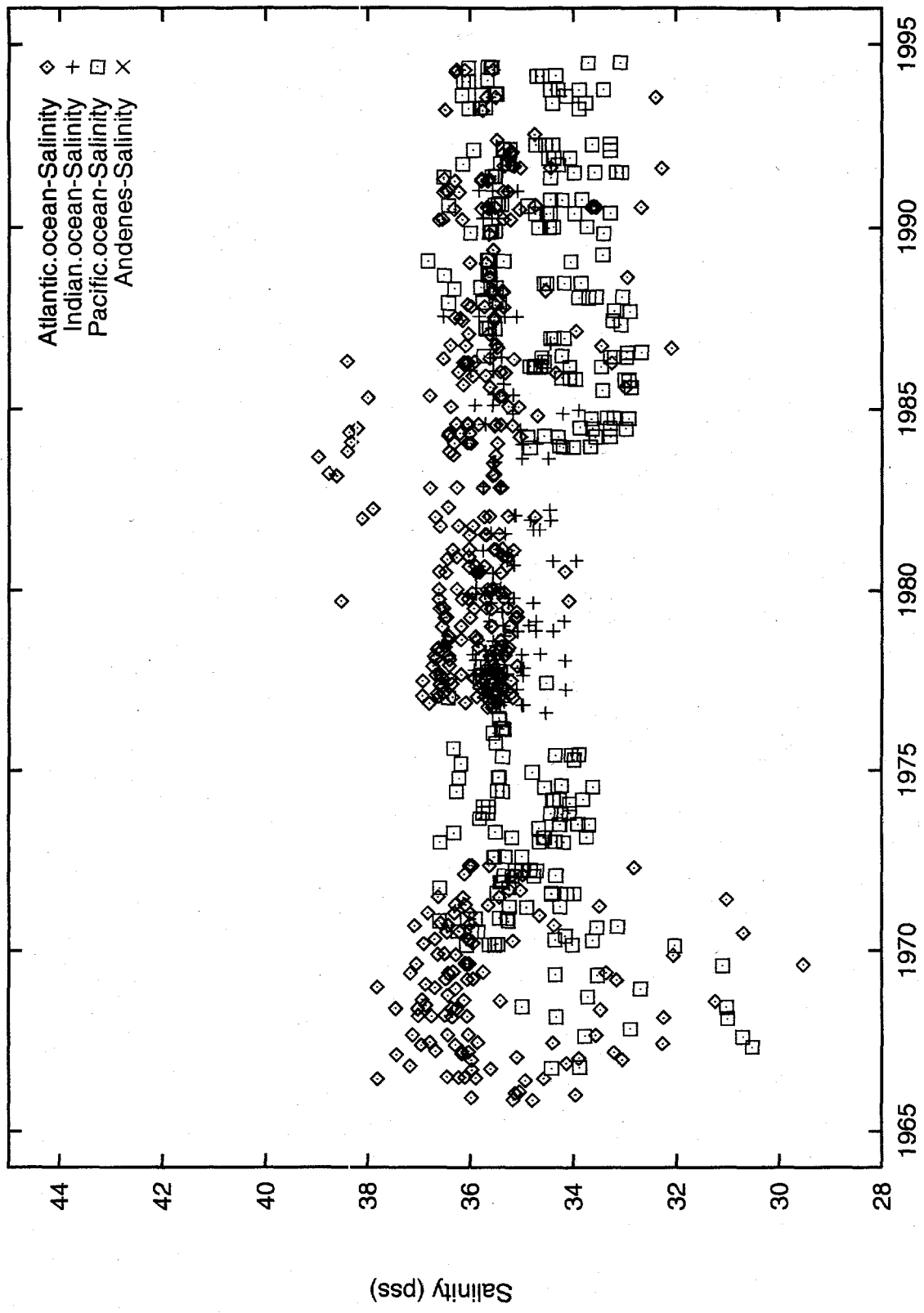


Figure 8. Salinity data over time.

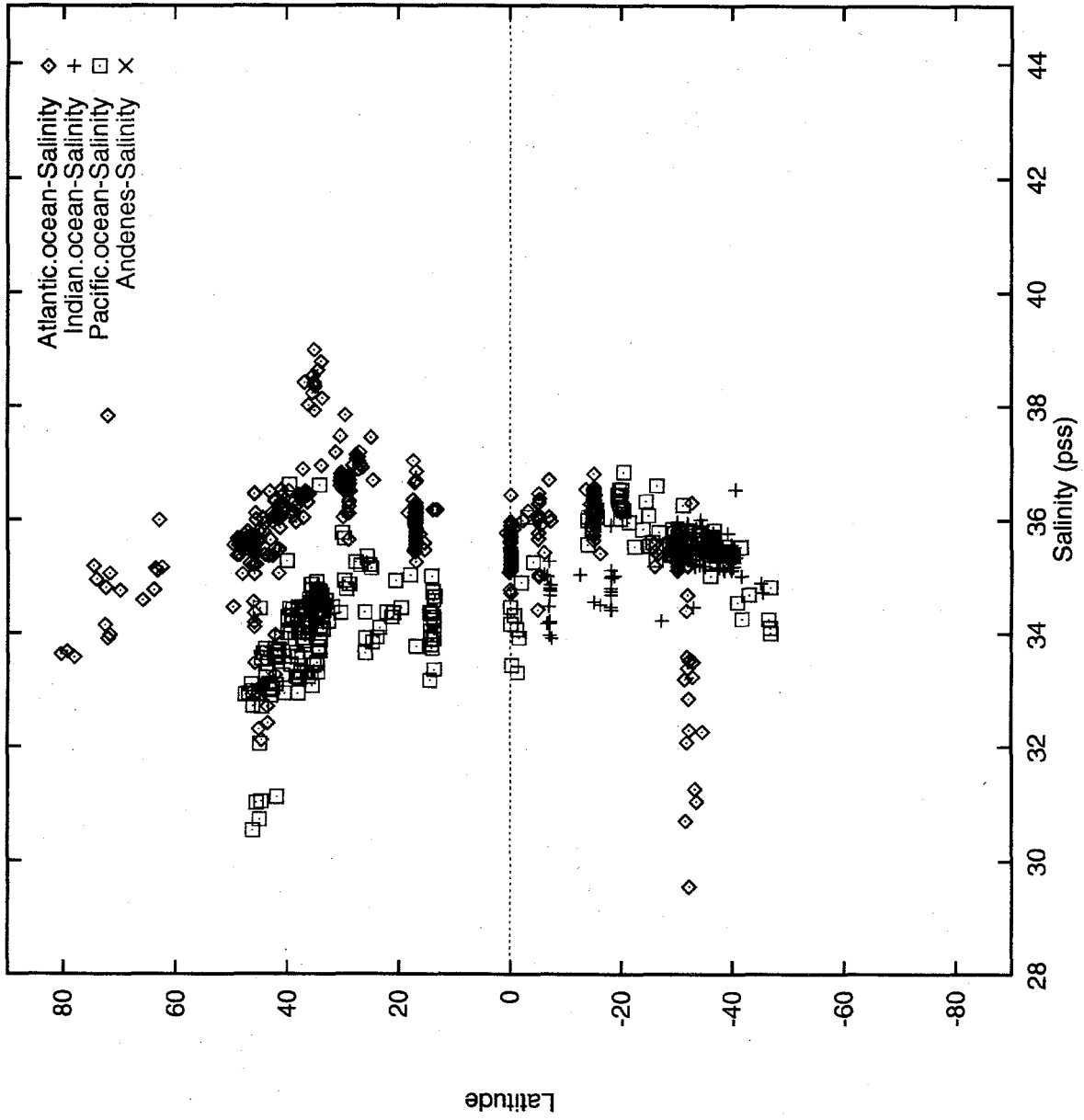


Figure 9. Salinity data by latitude.

## 8. DATA LIMITATIONS AND RESTRICTIONS

**Sample storage time.** Questions may arise about the reliability of the  $^{14}\text{C}$  results from the various sample treatments. Some have questioned the long storage time of the large seawater barrels (Nydal et al. 1979) even though it was difficult to understand how errors could arise in  $^{14}\text{C}$  data in ways other than through leakage. An experiment was performed using a series of nine pairs of samples. Nine samples were processed immediately after collection on board the ship, and the other nine were stored for a few weeks or months (Nydal et al. 1980, Nydal et al. 1984) for later processing. Only in one case out of nine was a difference of 4 sigma observed in  $\Delta^{14}\text{C}$  (TR-00039A and TR-00039B at station 20), but this may not necessarily be due to storage.

**Changes in sampling techniques.** Effects of sampling techniques changes are considered negligible by Dr. Nydal (Nydal et al. 1979), given the tests performed on storage time.

$\delta^{13}\text{C}$ . The  $\delta^{13}\text{C}$  values cannot be considered representative of true ocean carbonate values because flushing times affect the fractionation during the  $\text{CO}_2$  extraction and the completeness of the  $\text{CO}_2$  extraction from the seawater. The  $^{13}\text{C}/^{12}\text{C}$  ratios are only useful for the fractionation correction of the  $^{14}\text{C}$  data. When the  $^{13}\text{C}/^{12}\text{C}$  ratios were not measured the ratio was calculated as a mean value from neighboring data; this then was indicated by a flag '\*' for a total of 35 observations (see also Section 13)

**Temperature.** The accuracy of the measurements recorded by the temperature-recorder was, in general, better than 0.5 °C.

**Salinity.** Storage time might well have affected salinity values, especially before 1976 due to bottle leaks. The samples obtained before 1976 were stored until 1976 in glass bottles. The values can however be considered important for the evaluation of the stability of the water masses in the open ocean and along the continents, and for revealing the intrusion of fresh water from rivers.

**Depth.** The depth values were determined by the location of the inlet to the ship's water-cooling system relative to the water surface. One sample, sample LA2-0002A from Station 2, was taken from 50 m depth.

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## 10. DATA PROCESSING ACTIVITIES AND QUALITY ASSURANCE CHECKS PERFORMED BY CDIAC

CDIAC is committed to the quality assurance (QA) of data before distribution. In order to provide scientists and researchers with high-quality data, CDIAC reviews the data it receives for consistent formatting, completeness, reasonableness, and accuracy. Each review involves programming that is specific to each data set.

### Data Processing

CDIAC obtained the  $^{14}\text{C}$  ocean database as 82 separate files on a floppy disk from Dr. Reidar Nydal. CDIAC staff edited and created one ASCII data file for all data. A working copy of the file was created and processed in the following ways:

1. All original ASCII files were reformatted into a consistent format and combined into a single file with data from all sites.
2. Both SAS<sup>®</sup> and FORTRAN 77 codes were written and are available to the user for reading the ASCII data file.
3. Plotting codes were developed for data checking.

### QA Checks

1. The final data file was checked to ensure formatting consistency and to confirm the presence of missing data entries.
2. Checks were performed to confirm the uniqueness of each laboratory reference code.
3. Mean, minimum, and maximum values for  $\delta^{14}\text{C}$ ,  $\delta^{13}\text{C}$ , and corrected  $\Delta^{14}\text{C}$  data, depth, salinity and temperature were calculated and assessed for each site.
4. All  $\delta^{14}\text{C}$ ,  $\delta^{13}\text{C}$ ,  $\Delta^{14}\text{C}$ , depth, salinity and temperature values were plotted and assessed.
5. Any inconsistencies or suspect measurements were reported to and addressed by the investigator before the data set was released.
6.  $\Delta^{14}\text{C}$  ocean surface water data previously documented by CDIAC (Goyet et al., 1997, Östlund and Stuiver, 1988) were included in one plot for comparison.



## 11. HOW TO OBTAIN THE DATA AND DOCUMENTATION

The Nydal ocean surface water  $^{14}\text{C}$  database is available in machine-readable form from CDIAC without charge. The database may be retrieved from CDIAC's anonymous File Transfer Protocol (FTP) site, by using the address, login instructions, and FTP commands listed below. In addition, the database is available on 8-mm tape or IBM- or Macintosh-formatted floppy diskettes.

This documentation is available only from CDIAC. Electronic versions of the documentation are available via the World Wide Web from CDIAC's home page (<http://cdiac.esd.ornl.gov>). Requests for printed copies of the documentation should be addressed to

Carbon Dioxide Information Analysis Center  
World Data Center-A for Atmospheric Trace Gases  
Oak Ridge National Laboratory  
Post Office Box 2008  
Oak Ridge, TN 37831-6335, USA

The tape, diskette and documentation may also be ordered by telephone, facsimile, or electronic mail:

Telephone: (423) 574-3645 or (423) 574-0390

Fax: (423) 574-2232

Electronic mail: [cdiac@ornl.gov](mailto:cdiac@ornl.gov)

FTP access: **ftp cdiac.esd.ornl.gov** (or 128.219.24.36)

Enter **anonymous** at the userid prompt

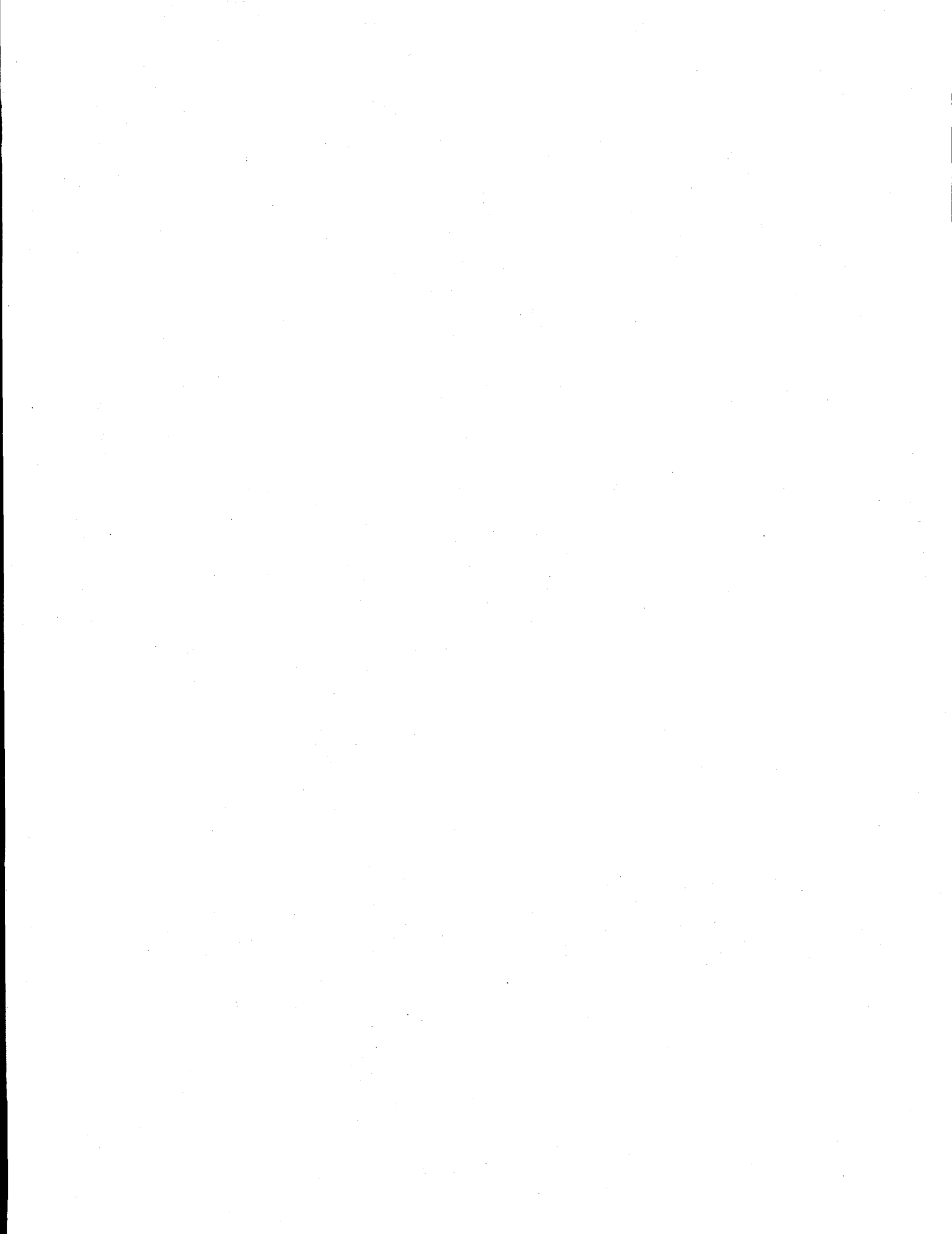
Enter your e-mail address as the password

Change the directory to **/pub/ndp057a** (i.e., ftp> *cd /pub/ndp057a*)

Retrieve all files (i.e., ftp> *mget \**)

As an alternative, one may access the following World Wide Web URL:  
**<http://cdiac.esd.ornl.gov/ftkdir/ftpinst.html>**

**NOTE:** When using these radiocarbon data in a presentation or publication, **PLEASE** acknowledge the principal investigator, Reidar Nydal, and the Norwegian University of Science and Technology!



**PART 2**

**CONTENT AND FORMAT OF THE FILES CONSTITUTING THIS DATABASE**



## 12. LISTING OF FILES PROVIDED

The following is a list of the files that compose the Nydal ocean surface water  $^{14}\text{C}$  database that are distributed by CDIAC along with this documentation. The files are available on a variety of media (see Sect. 11, "How To Obtain the Data and Documentation").

**Table 5. Listing of the files provided.**

File name and description	Size (Kbytes)
1. <b>ndp057a.txt</b> : General descriptive information file (this document).	13.3
2. <b>nydala.asc</b> : Single data file containing the location, $\delta^{14}\text{C}$ , $\delta^{13}\text{C}$ , $\Delta^{14}\text{C}$ , sampling depth, salinity and temperature estimates from 950 ocean surface water samples.	79.8
3. <b>ndp057a.for</b> : FORTRAN 77 code to read and print the file containing the data.	0.9
4. <b>ndp057a.sas</b> : SAS <sup>®</sup> data retrieval code to read and print the file containing the data.	0.8

## 13. FILE DESCRIPTIONS

This NDP contains one data file (**nydala.asc**) that provides 950 observations of  $\delta^{14}\text{C}$ ,  $\delta^{13}\text{C}$ , and  $\Delta^{14}\text{C}$  in ocean surface water  $\text{CO}_2$ , depths of measurements, salinity, and temperature. Samples were obtained from the North Atlantic to the Antarctic collectively from the R/V *Andenes* cruise and from 82 stations located in the Atlantic, Indian and Pacific oceans. The period of record differs from station to station. The earliest measurements were made in 1965, and the latest estimates are from 1994. Missing values are indicated by -999.9 values.

## Data File Format

Table 6. Contents of the data file.

Variable	Variable type	Variable format	Starting column	Ending column
STA	Alphanumeric	4.0	1	4
LABREF	Alphanumeric	10.0	6	15
WEEK	Numeric	4.0	17	20
SAMDAT	Numeric	6.0	22	27
LAT	Numeric	7.2	29	35
LONG	Numeric	7.2	37	43
DEPTH	Alphanumeric	6.0	45	50
SALIN	Numeric	7.2	52	58
TEMP	Numeric	6.1	60	66
DC14	Numeric	6.1	68	73
DC13	Numeric	7.2	75	81
FLAG13	Character	1.0	83	83
CRC14	Numeric	6.1	85	90
SIGMA	Numeric	6.1	92	97

where

STA is a four-character station code.

LABREF is a seven-to-nine character site code and sample reference number (e.g., SV-00034). The 5-digit sample reference number follows the site code and is separated from the site code by a minus sign (i.e., "-"). All sample reference numbers are unique. The ship codes and the range of sample reference numbers and total number of samples from each site were listed in Table 1. The complete listing of the observations can be found in Section 14. A symbol "#" was added to the sample reference number for a few sample numbers that were collected outside the main station location. Samples marked "A" and "B" are from the same collection, where one sample was processed immediately after collection and the other some weeks later. The addition "(2)" was added to indicate the sampling aboard the R/V *Andenes* on its return from Antarctica; these samples are not duplicates but were, in general, collected close to the locations for the sample series collected on the way down to Antarctica. At Station 45 sample TR-00099II the "II" label was added to distinguish this sample from a sample at Station 42 with the same number, now labeled TR-00099I.

WEEK is the week of sampling relative to the first week of 1963. Values range from 151 to 1645.

- SAMDAT is a six-character field that represents the year (since 1900), month, and day of the sampling (yy/mm/dd). Values range from 651115 to 940707.
- LAT is the latitudinal sampling location in decimal degrees. Northern hemisphere locations have positive values; southern hemisphere locations have negative values. Values range from -74.65 degrees to 80.52 degrees.
- LONG is the longitudinal sampling location in decimal degrees. Eastern hemisphere locations have positive values; western hemisphere locations have negative values. Values range from -180.00 degrees to 180.00 degrees.
- DEPTH is the sampling depth in meters. Values range from 2.5 to 11 meters. At Station 2 sample LA2-0002A has the correct depth of 50 m; a deep sample was used because the surface sample was lost. At a number of stations the depth was reported as 5-10 m.
- SALIN is the measured salinity. The quality of the salinity measurements is described in Section 8. Values range from 29.55 to 38.99 pss.
- TEMP is the measured temperature (see Section 8). Values range from -1.2 to +30.5 degrees Celsius.
- DC14 is the uncorrected (for decay) measurement of excess  $^{14}\text{C}$  in atmospheric  $\text{CO}_2$  expressed as  $\delta^{14}\text{C}$  per mille (‰) relative to the US National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards) oxalic acid standard. Ninety-five % of the  $^{14}\text{C}$  concentration in this standard represents the normal activity in recent wood for the year 1950 A.D. Values for DC14 range from -61.0 to 352.0 ‰.
- DC13 represents the deviation in the  $^{13}\text{C}/^{12}\text{C}$  ratio expressed as  $\delta^{13}\text{C}$  per mille (‰) relative to the PDB standard (Craig 1961). The  $^{13}\text{C}/^{12}\text{C}$  ratio was measured by mass spectrometry. The  $\delta^{13}\text{C}$  values provided are given as a guide for the calculation of the corrected  $\Delta^{14}\text{C}$  values. Values for DC13 range from -10.8 to 27.1 ‰.
- FLAG13 is a one-character flag code "\*" used to denote whether the DC13 is estimated as a mean value from neighboring data. There are 35 occurrences of this flag code.
- CRC14 is the  $^{14}\text{C}$  value expressed as  $\Delta^{14}\text{C}$  in per mille.  $\Delta^{14}\text{C}$  is corrected for isotopic fractionation using  $\delta^{13}\text{C}$  (DC13), and for radioactive decay relative to the  $\Delta^{14}\text{C}$  reference standard (NIST). Values range from -113.3 to 280.9 ‰.
- SIGMA is the standard deviation for CRC14. Values range from 3.0 to 15.0.

## Fortran 77 Data Retrieval Program

The following is a listing of the FORTRAN 77 data retrieval code (**ndp057a.for**) to read and echo print the data file.

```
c*****
c THIS FORTRAN 77 PROGRAM READS AND PRINTS THE 'nydala.asc' FILE CONTAINING
c SURFACE WATER OCEAN (CORRECTED) C14 MEASUREMENTS *
c where
c STA is a four-character indicator of the station.
c LABREF is a seven-to-nine character site code and sample reference number
c WEEK is the week of sampling relative to first week of 1963.
c SAMDAT is a six-character field: year, month, and day of the sampling period
c LAT is the latitudinal sampling location in decimal degrees.
c LONG is the longitudinal sampling location in decimal degrees.
c DEPTH is the sampling depth in meters.
c SALIN is the measured salinity in pss.
c TEMP is the measured temperature in °C.
c DC14 is the uncorrected (for decay) measurement of excess 14C in CO2
c expressed as δ14C per mille (‰) relative to the US National Institute
c of Standards and Technology
c DC13 represents the deviation in the 13C/12C ratio expressed as δ13C per
c mille (‰) relative to the PDB standard.
c FLAG13 is a one-character flag code '*' used to denote whether the DC13 is
c estimated as a mean value from neighboring data.
c CRC14 is the 14C content expressed as Δ14C in ‰. Δ14C is corrected for
c isotopic fractionation using δ13C (DC13), and for radioactive decay
c relative to the 14C reference standard (NIST).
c SIGMA is the standard deviation for CRC14.
c*****
      character*10 labref
      character*1 flag13
      character*6 depth
      character*4 sta
      open(10,file='nydala.asc',status='old')
      open(20,file='nydala.out',status='unknown')
      read(10,100)
100  format(//////////)
c read:
      do i=1,950
          read(10,200)sta,labref,iweek,isamdat,tlat,tlong,depth,salin,
          &temp,dc14,dc13,flag13,crc14,sigma
c echo print:
          write(20,200)sta,labref,iweek,isamdat,tlat,tlong,depth,salin,
          &temp,dc14,dc13,flag13,crc14,sigma
200  format(a4,x,a10,x,i4,x,i6,x,f7.2,x,f7.2,x,a6,x,f7.2,x,
          &f7.1,x,f6.1,x,f7.2,x,a1,x,f6.1,x,f6.1)
          enddo
          close (unit=10)
          close (unit=20)
      stop
      end
c*****
```



## SAS® Data Retrieval Program

The following is a listing of the SAS® data retrieval code (**ndp057a.sas**) written to read and calculate the means from the data file.

```
*****
* THIS SAS PROGRAM READS AND PRINTS THE 'nydala.asc' FILE CONTAINING SURFACE
* WATER OCEAN (CORRECTED) C14 MEASUREMENTS
* where
* STA is a four-character indicator of the station.
* LABREF is a seven-to-nine character site code and sample reference number
* WEEK is the week of sampling relative to first week of 1963.
* SAMDAT is a six-character field: year, month, and day of the sampling period
* LAT is the latitudinal sampling location in decimal degrees.
* LONG is the longitudinal sampling location in decimal degrees.
* DEPTH is the sampling depth in meters.
* SALIN is the measured salinity in pss.
* TEMP is the measured temperature in °C.
* DC14 is the uncorrected (for decay) measurement of excess 14C in CO2
* expressed as δ14C per mille (‰) relative to the US National Institute
* of Standards and Technology
* DC13 represents the deviation in the 13C/12C ratio expressed as δ13C per
* mille (‰) relative to the PDB standard.
* FLAG13 is a one-character flag code '*' used to denote whether the DC13 is
* estimated as a mean value from neighboring data.
* CRC14 is the 14C content expressed as Δ14C in ‰. Δ14C is corrected for
* isotopic fractionation using δ13C (DC13), and for radioactive decay
* relative to the 14C reference standard (NIST).
* SIGMA is the standard deviation for CRC14.
*****
```

```
data in;
infile 'nydala.asc' missover firstobs=17;
input @1 sta $char4. @6 labref $char10. @17 week 4. @22 samdat 6.
@29 lat 7.2 @37 long 7.2 @45 depth $char6. @52 salin 7.2
@60 temp 6.1 @68 dc14 6.1 @75 dc13 7.2 @83 flag13 $char1.
@85 crc14 6.1 @92 sigma 6.1;
if dc13=-999.9 then dc13=.;
if crc14=-999.9 then crc14=.;
if depth='-999.9' then depth='.';
if temp=-999.9 then temp=.;
if salin=-999.9 then salin=.;
if dc14=-999.9 then dc14=.;
if sigma=-999.9 then sigma=.;
proc means;
*****
```

SAS® is the registered trademark of the SAS Institute, Inc., Cary, North Carolina, 27511, USA.

## 14. COMPLETE LISTING OF DATA FILE

The following table lists the data file, **nydala.asc**, annotated with station numbers and sampling dates (see previous section). A symbol “#” was added to the sample reference number for a few sample numbers that were collected outside the main sample location. Samples marked “A” and “B” are from the same collection, where one sample was processed immediately after collection and the other some weeks later. The addition “(2)” was added to indicate the sampling by the R/V *Andenes* on its return from Antarctica; these samples are not duplicates but were, in general, collected close to the locations for the sample series collected on the way down to Antarctica. At Station 45 sample TR-00099II the “II” label was added to separate this sample from a sample at Station 42 with the same number, labeled TR-00099I. A one-character flag code “\*” was used to denote whether the DC13 is estimated as a mean value from neighboring data; this flag code follows the estimated DC13 value. Missing data are listed as -999.9 values.

**Table 7. Full annotated listing of the data file.**

```
*****
* Carbon-14 Measurements in Surface Water CO2 from *
* the Atlantic, Indian and Pacific Oceans, 1965-1994 *
* *
* Author: Reidar Nydal *
* Department of Physics - NTNU *
* Sem Saelandsv. 9 *
* 7034 Trondheim, Norway *
* *
* Tel: (47) 73 59 33 08 *
* FAX: (47) 73 59 36 28 *
* E-mail: nydalr@Phys.unit.no *
* *
* NDP-057A (March 1998) *
*****
```

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
Andenes Cruise Atlantic Ocean: 22 samples (of the total of 32) (1989-1990) (Andenes Research Vessel); 6°N-75°S, 12°-57°W													
An0.	A-00005	1407	891213	5.05	-23.90	5.0	-999.90	27.5	149.0	0.70		86.1	4.4
An0.	A-00005(2)	1420	900317	4.83	-26.13	5.0	-999.90	28.5	154.0	1.50		89.1	4.2
An0.	A-00006	1407	891214	0.40	-25.68	5.0	-999.90	26.5	157.0	0.90		93.6	4.1
An0.	A-00006(2)	1420	900316	-0.42	-28.48	5.0	-999.90	27.2	146.0	1.90		80.1	4.9
An0.	A-00008	1407	891216	-9.77	-29.00	5.0	-999.90	26.9	143.0	1.20		79.5	3.8
An0.	A-00008(2)	1420	900314	-9.63	-32.73	5.0	-999.90	27.8	157.0	1.60		91.7	5.1
An0.	A-00009	1407	891217	-14.75	-30.82	5.0	-999.90	26.6	159.0	1.70		93.6	3.9
An0.	A-00009(2)	1420	900313	-13.43	-34.47	5.0	-999.90	27.8	161.0	2.40		93.9	4.9
An0.	A-00010	1408	891221	-24.57	-37.80	5.0	-999.90	24.9	171.0	1.80		104.0	4.1
An0.	A-00010(2)	1419	900306	-25.00	-42.68	5.0	-999.90	26.9	168.0	1.70		101.4	3.7
An0.	A-00011	1408	891223	-30.07	-45.75	5.0	-999.90	22.6	180.0	0.90		115.0	4.2
An0.	A-00011(2)	1419	900305	-30.38	-41.60	5.0	-999.90	24.0	185.0	1.20		118.9	4.0
An0.	A-00012	1409	891230	-44.62	-56.23	5.0	-999.90	15.6	111.0	2.30		46.5	4.0
An0.	A-00012(2)	1418	900301	-44.97	-38.78	5.0	-999.90	13.8	115.0	2.80		49.2	4.2
An0.	A-00013	1410	900102	-52.50	-48.77	5.0	-999.90	7.2	76.0	2.00		13.9	4.0
An0.	A-00013(2)	1418	900228	-52.32	-37.05	5.0	-999.90	4.4	-7.0	0.90		-62.6	3.7
An0.	A-00014	1411	900108	-61.70	-14.20	5.0	-999.90	-1.1	-41.0	-0.60		-92.4	3.8
An0.	A-00014(2)	1417	900225	-59.90	-28.20	5.0	-999.90	1.2	-61.0	0.80		-113.3	3.8
An0.	A-00015	1412	900116	-70.05	-12.58	5.0	-999.90	-0.9	-56.0	0.60		-108.4	4.3
An0.	A-00015(2)	1416	900216	-70.05	-12.58	5.0	-999.90	-0.9	-58.0	1.40		-111.4	4.2
An0.	A-00016	1415	900206	-74.65	-34.13	5.0	-999.90	-1.1	-37.0	-0.60		-88.1	4.4
An0.	A-00016(2)	1415	900209	-73.97	-33.02	5.0	-999.90	-1.2	-25.0	2.30		-82.2	4.1
Station 01 Atlantic Ocean: 1 sample in Barentz Sea (1966); 74°14'N, 20°11'E													
S01.	SV-00008	179	660602	74.23	20.18	4.0	34.95	0.1	134.0	1.00		73.1	9.0
Station 02 Atlantic Ocean: 6 samples (1965 and 1990); 74°-81°N, 29°-42°E													
S02.	SV-00002#	151	651121	74.67	39.00	4.0	35.19	-999.9	126.0	1.20		66.2	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S02.	LA1-00001	1438	900721	77.72	32.50	4.0	-999.90	2.7	-999.9	1.80		61.5	4.4
S02.	LA3-00001	1439	900723	79.37	30.33	6.0	33.68	4.8	-999.9	1.20		56.2	4.2
S02.	LA4-00001#	1439	900727	79.02	41.90	5.0	-999.90	2.7	-999.9	2.30		60.3	3.8
S02.	LA2-00002A	1439	900723	78.20	29.83	50.0	33.58	3.5	-999.9	2.00		59.4	4.6
S02.	LA5-00002A	1440	900730	80.52	29.20	5.0	33.63	-1.1	-999.9	1.70		57.0	4.6
<b>Station 03 Atlantic Ocean: 4 samples (1966-1967, 1990); 69°-72°N, 07°-10°E</b>													
S03.	SV-00005	158	660109	71.80	8.72	4.0	33.98	-999.9	59.0	-0.40		5.1	10.0
S03.	SV-00007	163	660210	71.83	7.33	4.0	35.06	-999.9	113.0	0.50		54.1	10.0
S03.	SV-00032	211	670114	72.13	8.63	4.0	33.91	-999.9	174.0	-2.40		118.9	10.0
S03.	GS19-00001	1442	900813	69.98	9.60	4.0	34.76	12.2	-999.9	2.20		65.1	3.7
<b>Station 04 Atlantic Ocean: 4 samples (1965-1967); 72°-73°N, 14°-21°E</b>													
S04.	SV-00001	151	651115	72.53	20.07	4.0	34.81	-999.9	132.0	-2.90		80.2	11.0
S04.	SV-00009	181	660613	72.23	19.63	4.0	37.83	5.8	141.0	0.20		82.1	9.0
S04.	SV-00026	204	661124	72.63	14.65	4.0	34.15	-999.9	98.0	1.00		39.1	9.0
S04.	SV-00031	211	670110	72.63	14.67	4.0	-999.90	-999.9	120.0	0.40		60.9	10.0
<b>Station 05 Atlantic Ocean: 3 samples (1965-1966, 1991); 62°-66°N, 11°-16°W</b>													
S05.	SV-00003	154	651212	64.47	-11.00	4.0	-999.90	-999.9	137.0	-0.40		79.2	11.0
S05.	SV-00011	182	660620	66.00	-12.50	4.0	34.59	-999.9	135.0	1.20		74.1	7.0
S05.	MO16-00001	1497	910906	62.58	-15.52	4.5	35.17	11.5	-999.9	2.30		35.4	4.3
<b>Station 06 Atlantic Ocean: 5 samples (1965-1967, 1992); 63°-64°N, 05°E-04°W</b>													
S06.	SV-00004#	154	651209	63.03	3.73	4.0	36.00	-999.9	12.0	-4.40		-35.8	10.0
S06.	SV-00006	161	660127	63.75	-1.00	4.0	35.15	-999.9	125.0	1.50		65.1	9.0
S06.	SV-00010	182	660621	63.42	-4.00	4.0	-999.90	-999.9	107.0	2.60		42.1	9.0
S06.	SV-00033	213	670125	63.42	-4.00	4.0	35.11	-999.9	78.0	1.90		17.9	10.0
S06.	JH5-00212	1542	920715	64.00	5.00	3.0	34.77	7.5	-999.9	1.85		49.2	4.1

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (location) (decimal degrees)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 07 Atlantic Ocean: 23 samples (1966-1967, 1976-1990); 42°-46°N, 07°-12°W</b>													
S07.	SV-00021	196	660926	45.20	-7.93	9.0	35.62	20.0	137.0	1.90		74.1	9.0
S07.	SV-00030	209	670101	44.72	-8.25	9.0	33.07	14.0	144.0	1.00		81.9	10.0
S07.	TO-00001A	718	760927	46.00	-7.50	7.5	35.68	18.2	124.0	-0.50		65.9	14.0
S07.	TO-00001B	718	760927	46.00	-7.50	7.5	35.59	18.2	123.0	-9.30		84.9	10.0
S07.	TO-00007	740	770305	46.00	-7.42	7.0	35.52	11.8	110.0	-7.40		67.7	8.0
S07.	TO-00015#	757	770629	46.00	-11.78	7.5	35.23	17.4	149.0	-7.50		104.7	8.0
S07.	TO-00022	779	771128	46.00	-7.38	7.0	35.57	14.6	124.0	-6.10		78.7	8.0
S07.	TO-00025	782	771223	46.00	-7.42	7.0	-999.90	13.0	126.0	-7.00		81.7	8.0
S07.	TO-00033	798	780416	46.00	-7.25	6.5	35.57	12.0	100.0	-7.90		58.6	10.0
S07.	TR-00116	861	790625	46.00	-7.50	9.4	35.60	16.8	137.0	-5.00		87.5	11.0
S07.	TB-00173	933	801114	46.00	-7.50	9.0	36.47	14.2	139.0	-2.80		84.4	10.0
S07.	TR-00206	992	811230	42.75	-8.47	7.8	-999.90	13.2	131.0	-7.70		88.3	7.0
S07.	TB-00217	1008	820424	46.00	-8.00	9.8	36.45	9.2	129.0	-3.40		77.1	6.0
S07.	TB-00241	1054	830308	46.00	-7.17	7.0	35.58	18.2	121.0	-10.10		84.0	5.0
S07.	TB-00242	1055	830318	46.00	-7.50	10.0	35.54	11.7	128.0	-9.10		89.0	5.0
S07.	TQ-00251	1083	830926	46.00	-7.67	10.3	35.53	18.8	150.0	-6.60		105.0	5.0
S07.	TQ-00273	1110	840405	46.00	-7.50	9.0	35.05	12.5	114.0	-1.00		57.2	5.4
S07.	TQ-00283	1125	840720	46.00	-7.58	10.7	35.54	20.8	160.0	0.50		96.9	4.0
S07.	TQ-00317	1167	850512	46.00	-7.60	10.8	35.45	14.2	151.0	-0.10		90.3	4.3
S07.	TQ-00341	1201	860104	46.00	-7.55	9.2	34.36	20.1	189.0	-2.20		131.0	6.6
S07.	TQ-00366	1241	861006	46.00	-7.55	9.5	33.48	17.9	99.0	-2.00		44.2	5.8
S07.	A-00001	1405	891203	45.05	-10.60	5.0	-999.90	14.6	156.0	0.90		92.6	5.7
S07.	A-00001(2)	1422	900327	44.60	-8.85	5.0	-999.90	13.5	164.0	0.20		101.6	5.0
<b>Station 07B Atlantic Ocean: 22 samples (1985-1994); 46°-50°N, 14°-24°W</b>													
S07B	TQ-00328	1181	850818	48.72	-18.00	8.2	35.64	16.3	137.0	-0.30		77.2	5.1
S07B	BT-00057	1197	851207	46.22	-18.00	10.7	35.72	14.5	153.0	-0.10		91.8	5.5
S07B	TQ-00340#	1199	851219	47.07	-15.87	8.0	-999.90	13.5	139.0	0.00		78.2	4.0
S07B	TQ-00365	1238	860919	48.28	-18.67	8.2	35.49	15.2	125.0	0.10		65.2	4.9

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (location) (decimal degrees)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S07B	TQ-00378	1258	870205	47.58	-18.00	9.5	35.65	13.8	143.0	0.30		81.0	4.7
S07B	TQ-00391	1277	870620	47.00	-18.00	9.5	35.55	15.0	-999.9	-999.90		-999.9	-999.9
S07B	TQ-00410	1297	871105	47.72	-18.00	9.3	35.74	14.9	-999.9	-999.90		-999.9	-999.9
S07B	TQ-00411	1299	871120	46.33	-18.00	9.5	35.53	14.8	154.0	-0.30		93.5	4.8
S07B	TQ-00425	1317	880321	48.17	-18.00	11.0	35.63	11.9	139.0	-0.90		80.4	3.5
S07B	TQ-00426	1319	880407	48.67	-18.00	10.0	35.39	13.0	115.0	-1.10		57.3	3.6
S07B	TQ-00438	1338	880820	49.02	-18.05	9.0	35.68	16.5	-999.9	-999.90		-999.9	-999.9
S07B	TQ-00459	1377	890519	49.63	-18.00	10.9	35.57	13.3	126.0	0.60		64.4	4.2
S07B	TQ-00487	1436	900707	47.23	-18.00	10.6	35.80	16.5	137.0	-0.20		76.4	3.9
S07B	TQ-00488	1438	900721	47.97	-17.93	9.4	35.54	-999.9	143.0	1.40		78.9	3.9
S07B	TQ-00511	1476	910409	47.33	-18.00	10.8	35.68	12.7	128.0	-0.70		68.8	4.4
S07B	TQ-00512	1478	910423	47.00	-18.00	10.3	35.66	12.9	140.0	-2.10		82.8	3.7
S07B	TQ-00526	1495	910820	49.83	-17.67	11.0	34.47	17.8	130.0	-1.00		71.6	4.5
S07B	TQ-00539#	1515	920109	49.12	-14.78	11.0	35.38	11.4	-999.9	-999.90		-999.9	-999.9
S07B	TQ-00540#	1517	920123	46.77	-23.73	9.0	35.24	12.4	141.0	0.80		77.8	3.9
S07B	TQ-00553	1576	930312	47.20	-19.50	9.5	35.78	11.6	128.0	-7.60	*	83.7	4.6
S07B	TQ-00562	1595	930722	47.93	-18.77	10.2	35.53	18.0	-999.9	-999.90		-999.9	-999.9
S07B	TQ-00592	1634	940422	48.87	-17.28	9.7	35.57	13.0	129.0	-0.70		69.1	4.4
<b>Station 08</b> Atlantic Ocean: 6 samples (1977-1981); 45°-46°N, 03°-01°W													
S08.	TR-00037	775	771101	45.58	-1.67	9.0	35.70	17.2	162.0	-7.10		116.7	10.0
S08.	TR-00127	872	790914	46.00	-2.50	9.3	34.11	17.9	120.0	-7.50		77.5	7.0
S08.	TR-00141	886	791221	46.00	-2.33	9.7	-999.90	10.7	147.0	-8.30		105.5	6.0
S08.	TR-00155	900	800326	46.00	-2.30	9.3	-999.90	10.3	161.0	-4.90		111.4	8.0
S08.	TR-00163	915	800708	46.00	-2.32	9.3	34.19	16.4	156.0	-6.80		110.4	6.0
S08.	TB-00187	948	810228	46.00	-2.67	10.0	35.39	13.9	126.0	-5.10		77.3	7.0
<b>Station 09</b> Atlantic Ocean: 33 samples (1984-1994); 39°-47°N, 43°-55°W													
S09.	BT-00013#	1101	840130	41.52	-55.00	9.0	35.49	14.9	173.0	-2.30		115.9	5.0
S09.	BT-00014	1101	840131	42.22	-44.92	9.0	36.33	16.0	174.0	-0.20		112.9	5.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (m)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S09.	BT-00025#	1115	840507	41.00	-55.00	9.0	36.43	17.2	176.0	0.10		112.9	5.0
S09.	BT-00037	1127	840804	41.38	-52.92	10.5	35.86	22.1	186.0	0.80		121.9	5.0
S09.	BT-00038	1128	840806	42.23	-45.00	10.5	36.06	22.1	189.0	0.50		124.5	5.2
S09.	TQ-00327	1181	850815	44.98	-45.00	8.2	33.01	20.9	158.0	3.00		96.1	5.2
S09.	BT-00063#	1216	860417	42.33	-55.00	9.0	33.27	16.2	121.0	-0.20		62.1	4.0
S09.	BT-00064	1216	860418	42.87	-45.00	9.0	36.11	16.0	166.0	0.20		103.5	3.7
S09.	TQ-00351	1218	860428	44.17	-45.00	9.4	35.93	17.5	154.0	0.10		91.9	4.9
S09.	TQ-00364	1238	860915	44.73	-45.75	8.2	32.12	16.2	113.0	0.90		52.0	7.1
S09.	TQ-00377	1258	870203	42.53	-45.00	9.5	36.06	17.7	173.0	-0.80		112.3	5.6
S09.	TQ-00381	1262	870302	42.23	-45.23	10.0	33.97	2.0	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00389	1277	870616	41.00	-45.00	9.5	36.17	20.4	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00408	1297	871102	43.53	-45.00	9.3	35.37	19.5	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00413	1300	871123	42.08	-45.00	9.5	36.07	19.2	164.0	0.00		102.3	3.6
S09.	TQ-00423	1316	880319	44.13	-45.00	11.0	35.39	14.5	121.0	-1.50		64.0	5.5
S09.	TQ-00428	1319	880410	46.17	-45.00	10.0	34.56	5.0	124.0	-1.70		67.6	3.6
S09.	TQ-00440	1339	880823	46.38	-45.03	9.0	32.98	13.8	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00447	1359	890113	44.47	-45.27	9.9	36.03	15.2	153.0	0.50		90.5	4.1
S09.	TQ-00457	1377	890516	46.00	-45.00	10.9	-999.90	6.1	105.0	0.80		44.3	3.8
S09.	TQ-00460	1400	891023	43.05	-48.13	9.0	35.65	16.9	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00484#	1436	900703	41.68	-55.00	10.7	35.06	23.0	162.0	0.60		98.3	3.6
S09.	TQ-00485	1436	900704	42.33	-45.00	10.7	36.34	23.6	167.0	0.30		104.0	4.3
S09.	TQ-00490	1439	900724	43.73	-45.00	9.0	32.71	16.0	122.0	0.10		61.1	3.9
S09.	TQ-00509	1475	910406	42.33	-45.00	10.9	36.32	17.4	169.0	0.70		104.6	4.1
S09.	TQ-00514	1478	910426	41.20	-44.87	10.3	36.53	19.1	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00524	1494	910818	45.25	-45.00	11.0	32.31	18.4	118.0	-1.10		60.3	5.3
S09.	TQ-00528	1497	910906	42.75	-45.00	9.7	35.37	22.0	151.0	-2.70		95.3	8.7
S09.	TQ-00552	1533	920514	42.25	-45.05	10.2	35.50	15.0	139.0	-0.50		79.2	4.5
S09.	TQ-00555#	1577	930316	39.83	-46.50	9.5	36.51	18.0	-999.9	-999.90		-999.9	-999.9
S09.	TQ-00564	1595	930725	43.63	-46.07	10.3	32.42	10.0	101.0	-3.10	*	47.5	3.6
S09.	TQ-00583	1632	940406	40.93	-43.35	10.3	36.30	16.3	-999.9	-999.90		-999.9	-999.9

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S09.	TQ-00590	1635	940425	41.33	-44.17	9.6	36.28	17.7	156.0	-2.00		97.8	4.3
<b>Station 10 Atlantic Ocean: 4 samples (1969-1970); 34°-38°N, 35°-44°W</b>													
S10.	SV-00102	334	690522	36.67	-35.50	8.0	36.45	18.0	277.0	2.00	*	205.7	10.0
S10.	SV-00111	347	690824	37.17	-37.68	7.5	36.04	25.0	183.0	4.50		112.7	8.0
S10.	SV-00123	360	691120	37.07	-35.47	8.5	-999.90	20.0	250.0	4.00		176.7	8.0
S10.	SV-00142#	389	700611	34.83	-43.17	7.0	-999.90	20.0	174.0	0.70		111.6	8.0
<b>Station 11 Atlantic Ocean: 10 samples (1966-1970, 1989); 35°-38°N, 28°-33°W</b>													
S11.	SV-00017	184	660707	37.13	-30.85	-999.9	36.47	-999.9	243.0	2.60		172.1	10.0
S11.	SV-00025	200	661025	35.50	-29.17	-999.9	-999.90	-999.9	152.0	1.60		137.1	9.0
S11.	SV-00043	231	670529	36.42	-32.00	8.0	36.31	20.0	202.0	2.80		132.9	10.0
S11.	SV-00052	245	670908	36.17	-33.00	7.0	36.46	24.0	164.0	2.00		98.9	8.0
S11.	SV-00059	259	671217	35.15	-29.33	6.0	-999.90	20.0	335.0	-1.40		269.9	10.0
S11.	SV-00070	273	680324	36.88	-30.75	6.0	36.51	18.0	141.0	1.20		78.8	9.0
S11.	SV-00076	284	680604	37.25	-31.05	8.0	36.37	21.0	159.0	3.00		92.8	8.0
S11.	SV-00095	318	690130	37.33	-28.66	8.0	36.89	16.0	266.0	2.00	*	195.7	11.0
S11.	SV-00146	403	700915	37.42	-31.93	7.5	36.45	24.0	198.0	1.70		132.6	8.0
S11.	BT-00003	1088	831102	36.93	-30.00	7.0	36.42	21.0	180.0	-1.00		116.0	5.0
<b>Station 11B Atlantic Ocean: 24 samples (1984-1994); 41°-49°N, 28°-35°W</b>													
S11B	BT-00015	1101	840201	41.55	-30.37	9.0	36.01	15.0	159.0	-1.90		101.9	5.0
S11B	BT-00027	1115	840509	41.43	-30.00	9.0	36.03	17.2	158.0	-0.50		97.9	4.0
S11B	BT-00039	1128	840807	41.35	-30.00	10.0	36.08	22.3	176.0	1.10		111.0	4.8
S11B	BT-00056	1197	851206	42.75	-30.00	10.7	35.97	14.6	160.0	-0.60		99.6	3.8
S11B	BT-00065	1216	860420	41.83	-30.00	9.0	36.06	15.5	155.0	0.20		92.7	3.8
S11B	TQ-00409	1297	871104	45.67	-30.00	9.2	36.00	16.2	-999.9	-999.90		-999.9	-999.9
S11B	TQ-00412	1299	871121	44.72	-30.00	9.5	-999.90	16.6	152.0	0.30		90.3	3.7
S11B	TQ-00424	1316	880320	46.33	-30.00	11.0	35.58	12.5	120.0	-0.60		60.9	4.9
S11B	TQ-00427#	1319	880408	47.58	-30.00	10.1	35.56	13.7	136.0	-1.10		77.3	3.6



Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S11B	TQ-00439	1338	880821	46.92	-30.00	9.0	35.63	13.8	-999.9	-999.90		-999.9	-999.9
S11B	TQ-00446	1359	890110	46.60	-30.75	9.9	35.71	13.7	-999.9	-999.90		-999.9	-999.9
S11B	TQ-00458#	1377	890517	49.00	-30.00	10.9	-999.90	11.6	119.0	0.40		57.8	3.8
S11B	TQ-00486	1436	900706	45.13	-30.00	10.7	35.66	18.2	137.0	1.00		73.6	4.2
S11B	TQ-00489	1438	900722	46.10	-29.78	9.6	35.69	18.8	148.0	2.50		80.6	3.5
S11B	TQ-00510	1476	910408	45.13	-30.00	10.9	35.80	13.7	136.0	0.70		73.7	4.4
S11B	TQ-00513	1478	910425	44.28	-30.33	10.5	35.80	16.4	150.0	0.40		86.9	3.9
S11B	TQ-00525#	1495	910819	48.17	-30.25	11.0	35.05	16.6	130.0	0.20		69.0	4.5
S11B	TQ-00527	1498	910915	45.67	-30.00	9.7	35.22	24.0	155.0	-1.30		96.1	4.4
S11B	TQ-00538	1515	920107	46.83	-30.00	11.1	35.23	14.0	-999.9	-999.90		-999.9	-999.9
S11B	TQ-00541#	1517	920124	46.08	-34.75	9.0	35.21	12.6	147.0	-0.90		87.2	3.9
S11B	TQ-00554	1576	930313	43.25	-30.00	9.5	36.50	14.0	136.0	-7.50		90.7	4.5
S11B	TQ-00563	1595	930723	46.23	-30.00	10.2	35.70	18.5	149.0	-0.90	*	89.4	4.4
S11B	TQ-00584	1632	940407	44.50	-29.00	10.3	-999.90	15.5	-999.9	-999.90		-999.9	-999.9
S11B	TQ-00591	1634	940423	45.80	-28.35	9.6	36.12	14.6	-999.9	-999.90		-999.9	-999.9
<b>Station 12 Atlantic Ocean: 7 samples (1968-1970, 1983-1986); 36°-40°N, 18°-23°W</b>													
S12.	SV-00084	302	681010	38.08	-22.88	8.0	36.45	23.0	192.0	3.30		123.8	8.0
S12.	SV-00127	376	700315	38.52	-22.30	8.0	35.96	14.0	183.0	3.50		114.6	8.0
S12.	BT-00004	1088	831103	36.42	-18.00	7.0	36.43	21.0	179.0	0.30		116.0	5.0
S12.	BT-00016	1101	840203	39.07	-18.00	9.0	36.07	15.0	165.0	-1.10		105.9	5.0
S12.	BT-00028	1115	840510	38.68	-18.00	9.0	36.22	16.8	163.0	-0.40		101.9	5.0
S12.	BT-00040	1128	840809	39.13	-18.00	10.0	36.29	21.3	182.0	0.00		119.8	5.2
S12.	BT-00066	1217	860421	39.03	-18.00	9.0	36.15	15.5	157.0	0.60		94.4	3.8
<b>Station 13 Atlantic Ocean: 2 samples (1967-1968); 32°-34°N, 13°-13°30'W</b>													
S13.	SV-00056	258	671207	32.50	-13.50	9.0	-999.90	19.0	218.0	0.30		153.9	11.0
S13.	SV-00083	295	680824	34.00	-13.00	9.0	36.95	24.0	221.0	2.80		151.8	6.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (m)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 14 Mediterranean Sea: 18 samples (1979-1986); 33°-38°N, 17°-25°W</b>													
S14.	TR-00126	871	790908	35.43	18.00	9.9	38.54	17.9	149.0	-6.20		102.5	7.0
S14.	TB-00172#	932	801109	34.00	24.00	9.0	-999.90	23.0	161.0	-1.70		103.4	8.0
S14.	TB-00196#	978	810921	34.00	24.17	9.6	-999.90	25.1	150.0	-3.80		98.3	5.0
S14.	TB-00205	991	811226	33.83	19.67	8.5	38.14	16.0	121.0	-9.10		82.3	7.0
S14.	TB-00216	1005	820403	35.22	18.50	10.0	37.92	15.0	144.0	-2.70		89.1	5.0
S14.	TB-00224	1020	820717	35.40	18.00	9.0	-999.90	25.4	-999.9	-999.90		-999.9	-999.9
S14.	TB-00240	1053	830304	34.63	21.22	7.0	38.63	13.3	148.0	-6.50		101.4	4.9
S14.	TB-00243#	1056	830323	34.00	23.33	10.0	38.78	13.6	101.0	-7.60		58.0	5.0
S14.	TQ-00250	1080	830908	35.30	18.58	8.5	38.99	26.5	-999.9	-999.90		-999.9	-999.9
S14.	BT-00005	1089	831107	35.30	18.00	7.0	38.42	22.0	153.0	0.00		92.0	5.0
S14.	TQ-00262	1093	831211	35.43	18.00	8.6	-999.90	18.2	151.0	-5.70		103.0	5.0
S14.	BT-00017	1102	840207	35.12	18.55	9.0	38.35	15.5	154.0	-0.20		93.9	5.0
S14.	BT-00029	1116	840514	35.30	18.00	9.0	38.38	18.2	151.0	-0.70		91.8	4.9
S14.	TQ-00282	1122	840625	35.60	17.48	8.0	38.23	24.0	169.0	1.10		104.9	4.0
S14.	BT-00041	1129	840813	35.30	18.00	10.0	-999.90	27.1	158.0	0.70		94.9	4.0
S14.	TQ-00305	1150	850107	35.47	18.00	8.0	-999.90	17.7	160.0	0.10		98.8	4.0
S14.	TQ-00316	1165	850427	36.28	18.67	6.0	38.02	17.3	155.0	0.40		92.8	4.0
S14.	BT-00067	1218	860428	37.05	18.00	9.0	38.42	17.5	155.0	1.20		90.8	3.6
<b>Station 15 Atlantic Ocean: 12 samples (1966-1971); 25°-29°N, 47°-53°W</b>													
S15.	SV-00016	184	660704	27.58	-50.50	9.0	-999.90	-999.9	182.0	-0.10		121.1	9.0
S15.	SV-00035	216	670216	25.00	-50.00	9.0	37.45	25.0	247.0	0.30		181.9	7.0
S15.	SV-00042	230	670527	27.00	-51.00	8.0	36.97	24.0	240.0	3.10		167.9	9.0
S15.	SV-00051	245	670905	27.82	-52.02	7.0	37.14	27.0	223.0	2.00		154.9	11.0
S15.	SV-00061	259	671216	26.90	-47.72	6.0	-999.90	24.0	226.0	-0.50		163.9	11.0
S15.	SV-00071	273	680321	27.33	-50.58	6.5	37.03	21.0	206.0	2.50		138.8	10.0
S15.	SV-00079	287	680630	27.33	-50.70	8.0	36.88	27.0	237.0	2.70		166.8	8.0
S15.	SV-00110	347	690822	27.67	-52.17	8.5	37.07	28.0	288.0	1.30		219.7	7.0
S15.	SV-00126	376	700311	26.67	-49.13	8.0	36.92	22.0	259.0	1.60		190.6	9.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S15.	SV-00145	402	700912	27.37	-50.97	7.5	37.11	28.0	267.0	1.90		197.6	9.0
S15.	TO-00006	734	770121	28.33	-49.88	7.0	36.96	23.8	207.0	-2.20		149.7	8.0
S15.	TO-00014	756	770624	28.40	-50.00	7.5	36.95	27.2	206.0	-5.30		154.7	8.0
<b>Station 16 Atlantic Ocean: 4 samples (1966-1969); 27°-32°N, 39°-46°W</b>													
S16.	SV-00024	200	661024	31.45	-39.00	-999.9	37.19	-999.9	201.0	1.10		136.1	9.0
S16.	SV-00087	301	681006	27.08	-43.75	8.0	-999.90	27.0	262.0	2.00	*	191.8	11.0
S16.	SV-00094	317	690126	27.58	-45.08	8.0	-999.90	23.0	264.0	2.00	*	193.7	12.0
S16.	SV-00101	334	690520	27.13	-43.03	8.0	37.19	23.0	290.0	2.00	*	219.7	12.0
<b>Station 17 Atlantic Ocean: 65 samples (1966-1990); 27°-31°N, 13°-20°W</b>													
S17.	SV-00014	183	660703	29.35	-15.72	9.0	36.12	28.0	100.0	-0.10		43.1	11.0
S17.	SV-00020	195	660925	29.67	-15.47	9.0	-999.90	25.0	263.0	-7.20		217.1	12.0
S17.	SV-00047	234	670623	30.60	-14.50	8.5	36.81	21.0	175.0	1.80		109.9	11.0
S17.	SV-00055	246	670915	29.07	-15.05	7.5	-999.90	23.0	251.0	-0.60		187.9	10.0
S17.	SV-00067	272	680316	29.00	-15.00	9.0	36.77	19.0	197.0	0.80		132.8	9.0
S17.	SV-00075	283	680601	30.50	-14.53	9.0	37.47	20.0	341.0	2.00	*	171.8	11.0
S17.	SV-00090	314	690101	29.67	-14.67	9.0	37.84	25.0	153.0	2.00	*	88.7	11.0
S17.	SV-00099	326	690325	28.78	-15.07	9.0	36.50	20.0	135.0	2.00	*	71.7	11.0
S17.	SV-00107	337	690609	29.00	-15.00	8.0	-999.90	20.0	225.0	2.00	*	156.7	12.0
S17.	SV-00115	348	690828	29.00	-14.92	9.0	36.11	23.0	193.0	1.50		127.7	8.0
S17.	SV-00119	361	691128	29.15	-15.00	9.0	36.52	24.0	150.0	2.10		86.7	8.0
S17.	SV-00131	382	700425	29.00	-15.33	9.0	36.70	19.0	189.0	2.90		121.6	10.0
S17.	SV-00154	393	700711	29.00	-15.33	9.0	36.23	22.0	184.0	4.10		114.6	10.0
S17.	SV-00162	406	701005	29.08	-15.75	8.0	36.60	23.0	178.0	1.10		114.6	10.0
S17.	SV-00166#	420	710117	29.00	-18.20	9.0	36.33	20.0	206.0	1.80		140.5	7.0
S17.	SV-00178	432	710409	29.00	-15.50	8.0	36.31	17.0	176.0	-0.10		115.5	10.0
S17.	SV-00182	443	710626	29.00	-14.95	9.0	36.64	20.0	184.0	4.60		113.5	10.0
S17.	SV-00206	454	710912	29.00	-16.00	9.0	-999.90	23.0	157.0	2.40		91.5	10.0
S17.	SV-00210	489	720508	29.00	-15.17	9.0	35.65	18.0	161.0	2.10		96.3	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S17.	TR-00001	724	761110	30.42	-14.25	10.0	36.82	22.4	168.0	-5.80		120.9	10.0
S17.	TR-00012	734	770119	30.00	-14.08	9.5	36.63	19.0	140.0	-9.20		100.7	6.0
S17.	TR-00013B	738	770217	30.00	-15.30	9.5	36.55	19.2	167.0	-3.70		114.7	7.0
S17.	TR-00013A	738	770217	30.00	-15.30	9.5	36.67	19.2	139.0	-8.30		97.7	11.0
S17.	TR-00025A	751	770519	30.00	-15.00	8.0	36.61	19.1	172.0	-6.00		124.7	7.0
S17.	TR-00025B	751	770519	30.00	-15.00	8.0	36.62	19.1	186.0	-3.40		131.7	10.0
S17.	TR-00036	760	770724	30.00	-15.00	7.5	36.57	20.8	155.0	-7.60		110.7	10.0
S17.	TR-00038A	764	770819	30.67	-14.58	9.5	36.69	22.4	151.0	-6.50		104.7	11.0
S17.	TR-00038B	764	770819	30.67	-14.58	9.5	36.60	22.4	140.0	-0.40		81.7	11.0
S17.	TR-00049A	777	771120	30.60	-14.98	9.9	36.75	22.2	162.0	-4.30		110.7	6.0
S17.	TR-00049B	777	771120	30.60	-14.98	9.9	-999.90	22.2	184.0	11.10		97.7	10.0
S17.	TR-00060	788	780204	30.50	-14.58	10.0	36.69	19.1	165.0	-5.60		116.6	6.0
S17.	TR-00061	792	780228	30.00	-15.33	9.0	36.72	19.1	163.0	-5.80		114.6	8.0
S17.	TR-00072	802	780510	30.00	-15.17	9.0	36.66	19.5	159.0	-5.50		110.6	10.0
S17.	TR-00073	805	780530	30.00	-14.78	9.5	36.64	19.9	132.0	-5.00		83.6	11.0
S17.	TR-00094	835	781225	30.00	-13.93	9.5	36.57	20.5	173.0	-6.30		126.6	6.0
S17.	TR-00105	847	790325	30.00	-14.50	9.6	36.52	19.0	165.0	-6.60	*	118.5	10.0
S17.	TR-00114	858	790605	30.00	-14.17	9.5	-999.90	20.1	156.0	-6.60		110.5	10.0
S17.	TR-00117	861	790627	30.00	-15.42	9.4	36.61	21.3	183.0	-8.00		139.5	8.0
S17.	TR-00128	875	791001	30.00	-15.17	9.6	36.63	22.7	173.0	-4.60		121.5	6.0
S17.	TR-00140	885	791215	30.00	-13.97	9.7	-999.90	19.9	165.0	-7.50		120.5	5.0
S17.	TR-00142	889	800108	30.00	-15.30	9.5	36.63	19.4	170.0	-7.20		124.4	5.0
S17.	TR-00154	899	800322	30.00	-13.92	9.5	-999.90	17.9	172.0	-6.50		125.4	7.0
S17.	TR-00162	914	800704	30.00	-13.83	9.9	36.63	21.3	178.0	-5.80		128.4	5.0
S17.	TB-00164	922	800827	30.08	-15.23	9.8	-999.90	23.1	179.0	-4.10		126.4	5.0
S17.	TB-00174	936	801202	30.00	-15.83	10.7	-999.90	19.2	177.0	-4.10		124.4	8.0
S17.	TB-00186	948	810224	30.00	-13.83	10.1	36.04	17.1	91.0	-10.70		56.3	8.0
S17.	TB-00198	980	811011	29.83	-14.67	10.5	36.60	21.6	-999.9	-999.90		-999.9	-999.9
S17.	TB-00207	994	820114	30.08	-14.87	10.0	36.70	18.8	170.0	-1.30		111.1	8.0
S17.	TB-00218	1009	820427	30.00	-13.88	9.8	-999.90	18.0	168.0	-3.30		114.1	5.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S17.	TB-00225	1023	820804	30.00	-15.20	10.5	-999.90	19.0	178.0	-1.20		118.4	5.2
S17.	TB-00231	1036	821102	30.47	-15.03	9.4	36.80	21.5	162.0	-3.60		108.1	4.0
S17.	TQ-00252	1083	830929	30.00	-14.72	10.3	-999.90	26.0	164.0	-6.50		117.0	5.0
S17.	TQ-00274	1110	840408	30.23	-15.12	9.0	-999.90	19.5	155.0	0.30		92.9	5.0
S17.	TQ-00284	1125	840722	30.00	-15.27	10.7	-999.90	21.8	187.0	0.50		122.9	5.0
S17.	TQ-00296	1139	841027	30.40	-15.10	9.5	-999.90	23.5	195.0	0.60		130.9	5.0
S17.	TQ-00307#	1152	850127	27.18	-16.27	9.5	-999.90	19.9	184.0	0.20		120.8	4.0
S17.	TQ-00318	1168	850514	30.22	-15.23	10.8	-999.90	20.1	166.0	16.00		108.0	5.2
S17.	TQ-00330	1184	850903	30.02	-15.28	10.0	-999.90	24.0	171.0	0.90		107.0	5.0
S17.	TQ-00342	1202	860107	30.00	-15.23	9.2	-999.90	20.1	173.0	0.10		110.0	5.2
S17.	TQ-00354	1221	860521	30.12	-15.22	8.0	-999.90	19.5	160.0	0.10		97.9	4.2
S17.	TQ-00367	1241	861008	30.00	-15.27	9.5	-999.90	24.1	178.0	-0.30		116.4	4.8
S17.	A-00002	1406	891208	29.57	-20.00	5.0	-999.90	21.1	181.0	0.50		117.2	5.3
S17.	TQ-00470	1420	900315	30.00	-15.23	10.0	36.63	18.9	173.0	0.50		109.0	3.7
S17.	A-00002(2)	1421	900324	30.22	-14.67	5.0	-999.90	18.4	165.0	0.90		100.8	4.1
S17.	TQ-00500	1460	901217	30.00	-14.70	10.5	36.54	20.7	164.0	0.10		101.1	3.4
<b>Station 18 Atlantic Ocean: 2 samples (1966-1967); 24°-27°N, 17°W</b>													
S18.	SV-00029	209	661229	26.10	-17.00	9.0	-999.90	20.0	230.0	-1.00		169.1	9.0
S18.	SV-00039	221	670323	24.70	-17.20	9.0	36.69	20.0	152.0	0.40		91.9	8.0
<b>Station 19 Atlantic Ocean: 24 samples (1966-1972, 1989-1990); 16°-19°N, 20°-23°</b>													
S19.	SV-00013	183	660701	17.33	-21.83	-999.9	36.24	-999.9	75.0	0.20		19.1	8.0
S19.	SV-00019	195	660921	17.83	-21.08	9.0	-999.90	28.0	121.0	1.30		60.1	9.0
S19.	SV-00046	234	670621	17.13	-21.93	8.5	35.88	23.0	72.0	1.40		12.9	9.0
S19.	SV-00054	246	670912	16.67	-21.92	7.5	-999.90	27.0	168.0	0.00		107.9	10.0
S19.	SV-00057	258	671204	17.50	-21.33	9.0	-999.90	25.0	183.0	0.00		121.9	8.0
S19.	SV-00066	272	680315	17.00	-21.92	9.0	36.08	21.0	140.0	-0.30		81.8	8.0
S19.	SV-00074	283	680529	17.50	-21.00	6.0	37.04	22.0	214.0	0.20		151.8	8.0
S19.	SV-00082	295	680820	17.00	-22.00	9.0	36.14	25.0	133.0	1.20		72.8	8.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S19.	SV-00091	313	681229	17.00	-21.83	9.0	-999.90	23.0	202.0	1.60		135.8	9.0
S19.	SV-00098	325	690323	17.27	-21.60	9.0	35.97	24.0	200.0	1.60	*	131.7	11.0
S19.	SV-00106	336	690607	17.50	-21.67	8.0	36.35	22.5	209.0	1.60	*	142.7	11.0
S19.	SV-00114	348	690826	18.38	-20.50	9.0	36.12	28.0	135.0	2.50		70.7	8.0
S19.	SV-00118	361	691125	17.22	-21.62	9.0	36.65	26.0	146.0	2.40		81.7	8.0
S19.	SV-00130	382	700423	17.25	-21.70	9.0	36.05	23.0	129.0	4.20		62.6	8.0
S19.	SV-00153	393	700709	17.00	-22.08	9.0	-999.90	25.0	106.0	3.10		42.6	9.0
S19.	SV-00161	405	701003	17.17	-21.75	8.0	-999.90	27.0	168.0	-0.20		108.6	9.0
S19.	SV-00165	420	710115	17.00	-22.13	9.0	36.85	22.0	143.0	2.10		79.5	9.0
S19.	SV-00177	432	710407	17.00	-22.08	8.0	36.12	20.0	125.0	1.10		64.5	9.0
S19.	SV-00181	443	710624	17.42	-21.33	9.0	35.45	20.0	146.0	2.60		81.5	9.0
S19.	SV-00205	454	710910	17.00	-21.83	9.0	35.26	20.0	148.0	4.00		79.5	10.0
S19.	SV-00197	477	720216	17.07	-22.00	9.0	36.13	22.0	129.0	1.30		68.3	7.0
S19.	SV-00209	488	720506	17.00	-22.00	8.5	35.99	21.0	81.0	3.10		19.3	10.0
S19.	A-00003	1407	891211	17.40	-20.03	5.0	-999.90	24.2	141.0	0.80		77.8	4.1
S19.	A-00003(2)	1421	900320	16.65	-20.93	5.0	-999.90	22.7	136.0	1.50		71.6	5.7
<b>Station 20 Atlantic Ocean: 39 samples (1976-1990); 15°-18°N, 17°-19°W</b>													
S20.	TR-00002	724	761111	17.08	-17.82	10.0	35.51	26.6	115.0	-5.00		67.9	6.0
S20.	TR-00011	734	770117	17.00	-18.07	9.5	35.73	19.0	50.0	-9.80		14.7	6.0
S20.	TR-00014A	738	770219	15.47	-17.82	9.5	35.60	22.5	77.0	-8.70		37.7	10.0
S20.	TR-00014B	738	770219	15.47	-17.82	9.5	35.48	22.5	76.0	-5.00		29.7	10.0
S20.	TR-00023	747	770423	17.00	-18.00	9.0	35.68	22.0	56.0	-8.70		17.7	6.0
S20.	TR-00026	751	770520	17.00	-18.07	8.0	35.78	21.0	68.0	-8.40		29.7	10.0
S20.	TR-00035A	760	770723	17.00	-18.00	7.5	35.94	25.8	73.0	-3.90		24.7	8.0
S20.	TR-00035B	760	770723	17.00	-18.00	7.5	35.95	25.8	86.0	-2.60		34.7	10.0
S20.	TR-00039B	764	770821	17.00	-17.95	9.5	-999.90	29.5	71.0	0.10		14.7	9.0
S20.	TR-00039A	764	770821	17.00	-17.95	9.5	36.69	29.5	106.0	-4.90		58.7	5.0
S20.	TR-00050	778	771121	17.58	-17.70	9.9	-999.90	26.2	75.0	-3.50		24.7	10.0
S20.	TR-00059	788	780202	17.10	-17.82	10.0	-999.90	19.1	63.0	-6.70		20.6	6.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (location) (decimal degrees)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S20.	TR-00062	792	780302	17.33	-17.83	9.5	-999.90	21.0	70.0	-5.10		24.6	10.0
S20.	TR-00071	802	780508	17.00	-17.92	9.0	-999.90	23.1	69.0	-4.80		22.6	5.0
S20.	TR-00074	805	780601	17.00	-17.83	9.5	35.86	19.9	64.0	-5.10		18.6	10.0
S20.	TR-00083	816	780819	17.00	-18.00	10.0	36.20	29.1	105.0	-5.70		58.6	7.0
S20.	TR-00086	821	780920	17.25	-17.33	9.5	35.92	29.4	111.0	-3.50		59.6	11.0
S20.	TR-00095	835	781227	17.00	-18.00	9.5	35.62	23.8	121.0	-9.40		82.6	11.0
S20.	TR-00106	848	790327	17.00	-17.92	9.6	36.02	22.6	101.0	-7.60		59.5	7.0
S20.	TR-00113	857	790603	17.00	-17.67	9.5	-999.90	22.4	61.0	-5.10		14.5	7.0
S20.	TR-00118	861	790628	17.00	-17.75	9.4	35.95	24.3	80.0	-6.10		36.5	11.0
S20.	TR-00129	875	791002	17.00	-17.92	9.6	36.18	28.1	115.0	-5.50		67.5	7.0
S20.	TR-00139	885	791213	17.00	-17.63	9.7	35.64	23.9	111.0	-6.50		66.5	6.0
S20.	TR-00143	889	800109	17.00	-17.90	9.5	35.69	22.4	119.0	-7.20		75.4	6.0
S20.	TR-00153	899	800320	17.00	-17.70	9.5	-999.90	18.9	53.0	-4.60		6.4	7.0
S20.	TR-00161	914	800702	17.00	-17.63	9.9	35.84	24.3	81.0	-5.00		34.4	6.0
S20.	TB-00165	922	800829	17.00	-17.83	9.8	36.05	26.9	111.0	-7.70		66.4	6.0
S20.	TB-00175	936	801204	17.00	-17.83	9.7	36.29	22.2	153.0	-3.90		101.4	5.0
S20.	TB-00185	947	810221	17.00	-17.82	10.1	35.56	19.4	109.0	-6.00		63.3	6.0
S20.	TB-00188	968	810714	17.00	-17.98	10.0	36.03	26.3	96.0	-2.10		43.3	8.0
S20.	TB-00208	994	820116	16.27	-17.85	10.0	35.75	21.1	118.0	-0.30		60.1	4.0
S20.	TB-00219	1009	820429	17.00	-17.88	9.7	-999.90	21.0	88.0	-2.40		35.1	5.0
S20.	TB-00226	1023	820806	17.23	-17.32	10.5	-999.90	26.0	120.0	0.20		60.3	4.8
S20.	TB-00232	1036	821104	17.13	-17.88	9.4	35.44	27.5	-999.9	-999.90		-999.9	-999.9
S20.	TQ-00331	1184	850905	17.17	-17.83	10.5	-999.90	28.3	109.0	0.40		49.3	3.9
S20.	TQ-00368	1241	861010	17.00	-17.82	9.5	36.11	29.1	127.0	0.40		66.0	4.1
S20.	TQ-00393	1280	870708	17.00	-17.87	10.7	36.21	26.8	-999.9	-999.90		-999.9	-999.9
S20.	TQ-00471	1420	900318	17.00	-17.87	10.0	36.18	22.8	123.0	1.00		61.0	3.2
S20.	TQ-00501	1460	901219	17.00	-17.80	10.5	36.24	23.4	134.0	0.00		72.7	3.6
<b>Station 21 Atlantic Ocean: 4 samples (1967, 1989-1990); 10°-14°N, 22°-24°W</b>													
S21.	SV-00028	218	670227	13.92	-23.30	9.0	36.18	25.0	181.0	0.80		117.9	9.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (%)	SIGMA
S21.	SV-00038	221	670321	13.25	-23.75	9.0	36.18	25.0	141.0	0.90		79.9	8.0
S21.	A-00004	1407	891212	10.00	-22.20	5.0	-999.90	27.3	161.0	1.50		96.1	4.9
S21.	A-00004(2)	1421	900319	10.15	-23.83	5.0	-999.90	25.7	143.0	1.10		79.0	4.1
Station 22 Atlantic Ocean: 43 samples (1976-1990); 01° S-02° N, 08° -14° W													
S22.	TR-00003	724	761113	0.08	-9.05	10.0	35.60	25.7	118.0	-7.20		75.9	9.0
S22.	TR-00010	733	770114	0.00	-9.57	9.5	35.89	27.0	111.0	-8.60		70.7	7.0
S22.	TR-00015	739	770221	0.00	-9.00	9.5	35.23	29.7	159.0	-9.20		118.7	11.0
S22.	TR-00022	747	770420	-0.50	-10.00	9.0	35.84	28.8	153.0	-10.80		116.7	11.0
S22.	TR-00027#	751	770522	0.00	-14.00	8.0	35.47	27.0	137.0	-7.20		93.7	6.0
S22.	TR-00034	760	770720	0.00	-10.00	7.5	35.81	24.0	103.0	-5.50		56.7	7.0
S22.	TR-00040	765	770824	0.00	-8.85	9.5	35.70	24.6	106.0	-7.20		63.7	9.0
S22.	TR-00051	778	771124	0.00	-9.18	9.9	35.11	28.8	154.0	-3.30		100.7	8.0
S22.	TR-00058	788	780130	0.00	-9.82	10.0	35.62	27.5	132.0	-4.50		82.6	7.0
S22.	TR-00063	792	780304	0.00	-9.47	9.5	35.64	28.1	134.0	-3.10		80.6	7.0
S22.	TR-00070	801	780505	0.00	-9.33	9.0	35.44	28.8	135.0	-4.80		85.6	10.0
S22.	TR-00075	805	780604	0.00	-9.25	9.5	35.27	25.7	134.0	-5.20		86.6	10.0
S22.	TR-00082	816	780816	0.00	-9.18	10.0	35.89	23.7	101.0	-6.40		56.6	7.0
S22.	TR-00087	821	780923	0.00	-9.20	9.5	36.44	25.4	112.0	-5.30		65.6	6.0
S22.	TR-00096	835	781229	0.00	-9.60	9.5	35.60	27.3	130.0	-5.30		81.6	9.0
S22.	TR-00107	848	790330	0.00	-9.23	9.6	35.14	29.7	145.0	-7.90		101.5	7.0
S22.	TR-00119	861	790701	0.00	-9.17	9.5	35.70	24.1	124.0	-5.80		77.5	6.0
S22.	TR-00130	875	791005	0.00	-9.42	9.6	35.72	26.0	158.0	-4.70		107.5	8.0
S22.	TR-00138	885	791211	0.00	-9.00	9.7	35.35	28.1	156.0	-5.50		107.5	5.0
S22.	TR-00144	889	800112	0.00	-9.33	9.5	35.60	28.0	140.0	-7.00		95.4	8.0
S22.	TR-00152	899	800317	0.00	-9.18	9.5	-999.90	28.1	143.0	-6.60		97.4	6.0
S22.	TR-00160	913	800629	0.00	-8.87	9.9	35.91	22.2	112.0	-5.50		65.4	5.0
S22.	TB-00166	922	800831	0.00	-9.33	9.8	35.75	22.2	118.0	-5.50		71.4	5.0
S22.	TB-00176	936	801207	0.00	-9.33	9.3	35.30	26.2	161.0	-3.50		107.4	9.0
S22.	TB-00184	947	810216	0.00	-9.52	10.1	35.52	28.0	155.0	-1.60		98.3	7.0



Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (location) (decimal degrees)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA	
S22.	TB-00189	968	810717	0.00	-9.27	9.9	35.70	21.6	119.0	-1.20		63.3	9.0	
S22.	TB-00199	981	811015	0.00	-8.83	10.5	35.97	27.5	115.0	-0.90		58.3	6.0	
S22.	TB-00209	995	820118	0.10	-9.28	10.0	34.77	27.0	164.0	-2.20		108.1	5.0	
S22.	TB-00220	1009	820502	0.00	-9.28	9.7	-999.90	26.4	156.0	-2.30		100.1	5.0	
S22.	TB-00227	1024	820809	1.25	-10.08	10.5	-999.90	24.0	-999.9	-999.90		-999.9	-999.9	
S22.	TB-00233	1036	821106	0.82	-10.00	9.4	35.77	25.2	156.0	-0.70		96.9	7.2	
S22.	TQ-00253	1084	831003	0.00	-9.25	10.2	-999.90	26.5	135.0	-6.40		89.0	4.0	
S22.	TQ-00264	1097	840106	0.28	-9.62	9.5	-999.90	28.0	155.0	-1.10		96.3	5.5	
S22.	TQ-00275	1111	840412	0.00	-9.53	9.0	-999.90	30.0	167.0	1.30		102.5	4.7	
S22.	TQ-00285	1126	840726	0.00	-9.50	10.5	35.20	24.4	172.0	1.00		107.9	4.0	
S22.	TQ-00297	1140	841031	0.00	-9.42	9.5	34.71	27.2	153.0	0.90		89.9	4.0	
S22.	TQ-00308	1153	850130	0.33	-9.77	9.5	35.08	28.5	179.0	0.90		114.8	4.0	
S22.	TQ-00319	1168	850519	-0.05	-9.13	10.8	35.40	28.1	153.0	0.80		90.1	4.2	
S22.	TQ-00332	1184	850908	-0.20	-9.32	10.5	-999.90	23.4	146.0	-0.10		85.3	4.8	
S22.	TQ-00343	1202	860111	-0.03	-9.43	9.2	35.34	27.8	140.0	-0.50		80.0	4.4	
S22.	TQ-00355	1222	860526	0.00	-9.38	8.0	35.17	27.5	145.0	0.90		81.9	4.7	
S22.	TQ-00472	1421	900320	0.00	-9.47	9.9	35.24	29.1	161.0	1.20		96.6	3.9	
S22.	TQ-00502	1460	901222	0.00	-9.48	10.5	35.37	28.7	155.0	0.50		92.3	3.6	
<b>Station 23 Atlantic Ocean: 25 samples (1966-1972, 1989-1990); 02°-08° S, 27°-34° W</b>														
S23.	SV-00012	183	660627	-5.42	-33.08	-999.9	35.91	-999.9	93.0	1.00		34.1	9.0	
S23.	SV-00018	194	660917	-7.20	-33.42	9.0	35.98	28.0	196.0	0.30		134.1	10.0	
S23.	SV-00027#	208	661224	-2.17	-31.97	9.0	35.99	28.0	191.0	4.40		110.1	10.0	
S23.	SV-00036	220	670317	-6.93	-33.72	9.0	36.05	29.0	168.0	1.60		103.9	8.0	
S23.	SV-00045	233	670617	-4.87	-32.82	8.5	34.42	28.0	129.0	1.10		67.9	10.0	
S23.	SV-00053	245	670908	-4.78	-32.83	7.5	36.06	27.0	174.0	-0.30		113.9	10.0	
S23.	SV-00065	271	680309	-5.17	-33.05	9.0	36.37	29.0	161.0	1.20		98.8	11.0	
S23.	SV-00073	282	680525	-5.00	-33.17	9.0	36.29	29.0	184.0	2.40		117.8	8.0	
S23.	SV-00081	294	680816	-6.00	-33.00	9.0	35.43	27.0	174.0	1.80		109.8	6.0	
S23.	SV-00089	313	681225	-6.83	-33.73	9.0	36.71	28.0	165.0	2.00	*	99.8	10.0	

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S23.	SV-00097	325	690319	-5.00	-33.08	9.0	36.08	30.0	209.0	2.00	*	141.7	10.0
S23.	SV-00105	336	690603	-5.00	-33.00	8.0	35.77	28.5	239.0	2.00	*	169.7	10.0
S23.	SV-00113	347	690822	-4.87	-33.00	9.0	36.09	27.0	206.0	2.30		138.7	8.0
S23.	SV-00117	360	691122	-5.08	-33.17	9.0	36.30	27.0	167.0	2.40		101.7	8.0
S23.	SV-00129	381	700419	-5.00	-32.92	9.0	36.02	29.0	131.0	3.20		65.6	9.0
S23.	SV-00152	392	700705	-5.00	-32.93	9.0	36.47	28.0	166.0	4.40		95.6	9.0
S23.	SV-00160	405	700929	-5.00	-32.92	8.0	36.02	24.0	156.0	1.10		94.6	9.0
S23.	SV-00164	420	710111	-5.00	-33.00	9.0	36.02	28.0	162.0	2.90		95.5	10.0
S23.	SV-00176	431	710403	-5.00	-33.17	8.0	35.67	29.0	178.0	1.60		113.5	10.0
S23.	SV-00180	442	710620	-3.12	-32.20	9.0	36.16	29.0	173.0	3.20		105.5	8.0
S23.	SV-00204	454	710906	-5.00	-32.83	9.0	35.04	26.0	171.0	2.80		104.5	8.0
S23.	SV-00196	476	720212	-5.10	-32.93	9.0	35.00	28.0	153.0	1.80		86.3	8.0
S23.	SV-00208	489	720511	-5.00	-33.00	8.5	36.04	29.0	144.0	1.80		80.3	10.0
S23.	A-00007	1407	891215	-4.93	-27.48	5.0	-999.90	26.7	145.0	0.50		82.5	4.3
S23.	A-00007(2)	1420	900315	-5.07	-30.57	5.0	-999.90	27.4	146.0	2.00		81.0	4.0
<b>Station 24 Atlantic Ocean: 1 sample (1967); 04°50'S, 21°20'W</b>													
S24.	SV-00058	257	671130	-4.83	-21.33	9.0	-999.90	27.0	122.0	0.70		61.9	8.0
<b>Station 25 Atlantic Ocean: 46 samples (1976-1990); 13°-17°S, 01°-03°E</b>													
S25.	TR-00004	725	761116	-15.18	2.13	10.0	36.11	19.7	101.0	-5.20		54.9	7.0
S25.	TR-00009	733	770112	-14.83	1.78	9.5	36.37	23.0	99.0	-9.50		61.7	7.0
S25.	TR-00016	739	770223	-13.50	2.00	9.5	36.54	26.4	127.0	-8.40		85.7	7.0
S25.	TR-00021	747	770418	-15.00	1.50	9.0	36.57	25.0	118.0	-4.40		69.7	11.0
S25.	TR-00028	752	770525	-15.00	1.00	8.0	36.38	21.2	108.0	-5.80		62.7	10.0
S25.	TR-00033	760	770718	-15.00	2.00	7.5	36.41	22.0	125.0	-5.60		78.7	8.0
S25.	TR-00041	765	770826	-14.88	1.95	9.5	36.20	20.6	98.0	-8.00		56.7	7.0
S25.	TR-00052	779	771128	-14.97	1.97	9.9	36.43	21.5	139.0	-4.10		87.7	10.0
S25.	TR-00057	787	780128	-15.08	2.25	10.0	36.43	24.5	97.0	-5.00		49.6	8.0
S25.	TR-00064	793	780307	-15.00	1.68	9.5	36.44	26.1	92.0	-3.40		41.6	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S25.	TR-00069	801	780503	-15.00	1.28	9.0	36.58	25.0	115.0	-4.70		66.6	9.0
S25.	TR-00076	806	780607	-15.00	2.17	9.5	36.51	23.6	127.0	-6.60		81.6	10.0
S25.	TR-00081	815	780813	-15.00	2.30	10.0	36.45	21.5	112.0	-6.40		67.6	10.0
S25.	TR-00088	822	780925	-15.08	2.17	9.5	36.45	19.4	114.0	-6.50	*	70.6	7.0
S25.	TR-00097	836	790101	-15.00	1.67	9.5	36.20	23.2	114.0	-5.30		67.5	7.0
S25.	TR-00108	848	790401	-15.00	2.33	9.5	36.48	25.0	95.0	-6.60		51.5	11.0
S25.	TR-00112	857	790529	-15.00	2.50	9.5	-999.90	24.3	108.0	-6.50	*	63.5	8.0
S25.	TR-00120	862	790703	-15.00	1.90	9.4	36.54	23.4	116.0	-7.70		74.5	5.0
S25.	TR-00131	876	791008	-15.00	1.92	9.6	36.06	19.6	91.0	-4.00		41.5	6.0
S25.	TR-00137	884	791208	-15.00	2.00	9.8	35.98	20.8	113.0	-6.10		67.5	5.0
S25.	TR-00145	890	800114	-15.00	2.13	9.5	36.28	22.8	118.0	-6.80		73.4	5.0
S25.	TR-00151	898	800314	-15.00	2.50	9.5	-999.90	24.8	94.0	-6.40		50.4	5.0
S25.	TR-00159	913	800627	-15.00	2.58	9.9	36.50	22.2	103.0	-7.90		61.4	5.0
S25.	TB-00167	923	800903	-15.00	2.00	9.8	35.91	18.2	109.0	-6.70		64.4	6.0
S25.	TB-00177	937	801209	-15.00	2.00	10.3	36.05	19.4	125.0	-3.10		72.4	6.0
S25.	TB-00183	947	810216	-15.00	2.00	10.2	36.36	23.4	102.0	-0.80		45.3	8.0
S25.	TB-00190	968	810719	-15.00	2.02	9.9	35.73	19.0	108.0	-0.90		52.3	9.0
S25.	TB-00200	981	811018	-14.75	2.15	10.5	36.25	18.5	83.0	0.10		25.3	7.0
S25.	TB-00210	995	820121	-15.00	2.00	10.0	35.65	23.0	154.0	0.10		93.1	6.0
S25.	TB-00221	1010	820505	-15.00	2.33	9.6	-999.90	22.2	143.0	-2.90		89.1	5.0
S25.	TB-00228	1024	820811	-15.00	2.62	10.5	-999.90	21.0	108.0	-0.50		50.1	12.0
S25.	TB-00234	1037	821109	-14.30	1.65	9.4	36.28	18.5	127.0	-0.30		68.1	6.0
S25.	TQ-00254	1084	831005	-15.08	2.40	10.0	36.35	19.4	113.0	-6.50		67.5	5.1
S25.	TQ-00265	1097	840108	-14.98	2.00	9.5	-999.90	25.0	-999.9	-999.90		-999.9	-999.9
S25.	TQ-00276	1111	840414	-15.15	2.12	9.0	36.45	26.0	138.0	1.30		74.9	4.0
S25.	TQ-00286	1126	840729	-16.07	2.88	10.5	35.42	21.2	141.0	0.60		79.9	4.0
S25.	TQ-00298	1140	841103	-15.17	2.28	9.5	-999.90	20.5	137.0	0.40		75.9	4.0
S25.	TQ-00309	1153	850202	-15.00	2.00	9.5	36.40	25.1	134.0	1.20		71.8	4.0
S25.	TQ-00320	1169	850521	-14.98	2.15	10.8	36.81	24.3	147.1	0.00		85.5	4.2
S25.	TQ-00333	1185	850910	-14.45	1.08	10.5	36.16	20.3	145.0	0.10		83.6	4.8

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S25.	TQ-00344	1203	860114	-15.00	2.07	9.2	36.25	23.9	120.0	0.70		59.0	5.1
S25.	TQ-00356	1222	860528	-15.00	2.28	8.0	36.54	24.5	135.0	2.20		69.6	3.5
S25.	TQ-00370	1242	861015	-15.00	2.05	9.5	36.41	21.7	133.0	-0.40		73.5	6.5
S25.	TQ-00395	1281	870713	-15.00	2.03	10.4	36.31	21.7	-999.9	-999.90		-999.9	-999.9
S25.	TQ-00473	1421	900323	-15.00	2.12	9.9	36.56	25.8	134.0	0.50		71.6	3.0
S25.	TQ-00503	1461	901224	-15.00	1.98	10.5	36.46	22.8	133.0	0.20		71.3	4.3
<b>Station 26 Atlantic Ocean: 5 samples (1977-1978); 25°-27°S, 10°-12°E</b>													
S26.	TR-00008	733	770110	-25.92	11.05	9.5	35.19	20.6	74.0	-9.50		36.7	11.0
S26.	TR-00020	746	770417	-26.50	11.00	9.0	35.41	22.0	118.0	-9.30		79.7	8.0
S26.	TR-00029	752	770527	-26.00	10.55	8.0	35.58	19.0	135.0	-5.20		86.7	8.0
S26.	TR-00032	759	770716	-26.00	10.00	8.0	35.45	17.0	160.0	-5.70		111.7	11.0
S26.	TR-00056	787	780126	-26.42	11.75	10.0	-999.90	22.7	121.0	-3.80		70.6	7.0
<b>Station 27 Atlantic Ocean: 40 samples (1976-1990); 27°-33°S, 14°-17°E</b>													
S27.	TR-00005	725	761119	-29.95	14.42	10.0	35.48	17.7	145.0	-7.50		101.9	7.0
S27.	TR-00017	739	770226	-29.95	14.42	9.5	35.47	21.2	133.0	-8.10		90.7	11.0
S27.	TR-00042	766	770829	-32.28	16.48	9.5	35.44	16.0	123.0	-7.30		79.7	10.0
S27.	TR-00053	779	771129	-29.65	14.08	9.9	35.44	19.2	127.0	-4.50		77.7	10.0
S27.	TR-00065	793	780310	-30.00	14.08	9.5	35.35	21.1	95.0	-4.20		46.6	8.0
S27.	TR-00068	801	780501	-30.00	15.00	9.0	35.30	17.3	117.0	-4.90		68.6	7.0
S27.	TR-00077	806	780609	-30.00	14.58	9.5	35.41	19.0	132.0	-6.20		85.6	6.0
S27.	TR-00080	815	780811	-30.00	14.70	10.0	35.43	16.3	126.0	-7.20		82.6	11.0
S27.	TR-00089	822	780927	-30.00	14.50	9.5	35.27	15.6	133.0	-5.80		85.6	9.0
S27.	TR-00098	836	790104	-30.00	14.92	9.5	35.26	19.4	96.0	-9.20		57.5	9.0
S27.	TR-00109	849	790404	-30.00	14.92	9.5	35.11	18.5	90.0	-7.70		49.5	7.0
S27.	TR-00111	856	790527	-30.00	14.58	9.5	35.12	17.2	110.0	-6.80		64.5	8.0
S27.	TR-00121	862	790706	-30.03	14.62	9.4	35.30	16.1	120.0	-7.20		76.5	8.0
S27.	TR-00132	876	791010	-30.00	14.58	9.6	35.37	16.8	141.0	-6.10		94.5	6.0
S27.	TR-00136	884	791206	-30.00	14.75	9.8	35.43	18.3	138.0	-6.40		91.5	6.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S27.	TR-00146	890	800117	-30.00	14.55	9.5	35.57	22.4	147.0	-6.70		101.4	6.0
S27.	TR-00150	898	800312	-30.00	14.83	9.5	-999.90	19.8	131.0	-6.90		86.4	6.0
S27.	TR-00158	913	800625	-30.00	15.00	10.0	35.43	17.4	160.0	-3.00		105.4	7.0
S27.	TB-00168	923	800905	-30.00	14.17	9.8	35.31	14.2	126.0	-7.00		82.4	5.0
S27.	TB-00178	937	801212	-30.00	14.35	10.3	35.38	18.0	120.0	-5.50		72.4	5.0
S27.	TB-00182	946	810214	-30.00	14.22	10.2	35.18	19.5	110.0	-0.70		52.3	8.0
S27.	TB-00191	969	810721	-30.00	14.25	9.9	35.45	15.6	124.0	-2.10		69.3	15.0
S27.	TB-00201	982	811021	-31.00	14.75	10.5	-999.90	16.0	118.0	-4.40		68.3	6.0
S27.	TB-00211	995	820124	-30.03	14.87	10.0	35.29	20.0	124.0	-2.00		69.1	5.0
S27.	TB-00235	1037	821111	-31.02	14.78	9.4	35.41	17.0	140.0	-3.80		91.8	4.9
S27.	TQ-00245	1071	830708	-30.22	15.45	9.5	35.58	16.2	135.0	-2.00		78.9	6.3
S27.	TQ-00255	1084	831008	-30.00	14.75	10.0	-999.90	16.0	146.0	-7.20		100.8	5.1
S27.	TQ-00266	1098	840110	-30.00	14.50	9.5	-999.90	21.0	126.0	-3.50		73.5	5.5
S27.	TQ-00277	1112	840417	-29.80	14.25	9.0	-999.90	19.8	144.0	0.90		81.9	4.0
S27.	TQ-00287	1127	840731	-30.00	14.48	10.5	35.52	16.6	175.0	3.10		105.9	4.0
S27.	TQ-00299#	1141	841105	-27.38	14.00	9.5	-999.90	20.2	176.0	0.40		112.9	4.0
S27.	TQ-00310	1154	850204	-29.65	14.13	9.5	35.28	22.2	133.0	0.30		72.8	3.0
S27.	TQ-00321	1169	850524	-30.00	14.52	10.8	-999.90	18.1	147.0	0.50		84.5	4.3
S27.	TQ-00334	1186	850921	-30.00	14.33	10.5	-999.90	17.7	158.0	0.40		95.3	5.5
S27.	TQ-00345	1203	860116	-30.05	14.40	9.2	35.43	22.7	137.0	0.90		74.5	4.3
S27.	TQ-00357	1222	860531	-30.00	14.50	8.0	35.64	19.3	148.0	-0.30		87.4	5.4
S27.	TQ-00371	1242	861018	-30.00	14.42	9.5	35.53	17.9	166.0	-0.40		104.8	4.7
S27.	TQ-00396	1281	870716	-30.00	14.42	10.4	35.55	17.3	-999.9	-999.90		-999.9	-999.9
S27.	TQ-00474	1422	900326	-30.00	14.42	9.9	35.38	22.1	136.0	0.20		74.5	3.8
S27.	TQ-00504	1461	901226	-30.00	14.37	10.5	35.28	20.3	124.0	0.80		62.4	4.0

Station 28 Atlantic Ocean: 20 samples (1967-1972); 31°-35°S, 50°-53°W

S28.	SV-00037	219	670312	-32.75	-51.27	9.0	33.23	24.0	225.0	2.10	*	156.9	9.0
S28.	SV-00044	232	670610	-32.17	-51.17	8.5	32.29	18.0	219.0	3.00		148.9	10.0
S28.	SV-00048	244	670902	-31.75	-50.53	7.5	33.59	19.0	205.0	1.90		137.9	7.0

Station	LABREF	Week	SAMDAT	Lat	Long	Depth	Salin	Temp	DC14	DC13	Flag	CRC14	SIGMA
		(exposure)		(location)	(decimal degrees)	(m)	(pss)	(°C)	(‰)	(‰)	(*)	(‰)	
S28.	SV-00064	270	680303	-34.53	-52.70	9.0	32.27	23.0	304.0	3.50		227.8	8.0
S28.	SV-00072	281	680518	-32.80	-51.42	9.0	33.50	17.0	352.0	2.00		277.8	8.0
S28.	SV-00080	293	680807	-33.17	-51.67	9.0	31.26	14.0	309.0	4.50		230.8	8.0
S28.	SV-00088	312	681217	-32.58	-51.00	9.0	36.30	25.0	115.0	2.10	*	52.8	10.0
S28.	SV-00096	324	690313	-31.28	-50.23	9.0	33.19	28.0	347.0	2.10	*	271.7	11.0
S28.	SV-00104	335	690527	-31.83	-50.92	9.0	33.39	20.5	279.0	2.10	*	207.7	12.0
S28.	SV-00112	346	690813	-32.13	-51.63	9.0	29.55	17.0	309.0	0.70		239.0	8.0
S28.	SV-00116	359	691115	-31.75	-50.87	9.0	32.08	22.0	265.0	2.40		196.0	8.0
S28.	SV-00128	380	700412	-31.88	-51.25	9.0	35.19	23.0	179.0	3.20		110.6	10.0
S28.	SV-00151	391	700628	-31.50	-50.83	9.0	30.71	18.0	278.0	0.20		211.6	9.0
S28.	SV-00159	403	700916	-31.67	-50.50	8.0	34.40	16.0	208.0	0.90		142.6	9.0
S28.	SV-00163	417	701222	-31.83	-50.50	6.5	34.68	18.0	193.0	1.60		127.6	9.0
S28.	SV-00175	430	710323	-32.08	-51.03	8.0	33.52	26.0	252.0	2.20		181.5	10.0
S28.	SV-00179	440	710603	-33.47	-52.55	9.0	31.04	14.0	284.0	2.40		212.5	10.0
S28.	SV-00203	452	710827	-31.92	-50.47	9.0	-999.90	16.0	238.0	2.50		169.5	5.0
S28.	SV-00195	475	720202	-31.83	-50.75	7.5	35.21	18.0	203.0	1.80		137.3	10.0
S28.	SV-00207	486	720421	-32.00	-51.00	7.0	32.85	22.0	269.0	1.80		199.3	9.0
<b>Station 31 Indian Ocean: 3 samples (1978-1981); 06°-07°N, 67°-69°E</b>													
S31.	TO-00031	795	780324	-7.00	69.00	7.0	34.67	28.0	143.0	-5.20		95.0	7.0
S31.	TR-00125	870	790829	-6.90	68.88	9.8	35.28	27.4	140.0	-6.90		95.0	8.0
S31.	TR-00195	976	810911	-7.00	67.50	10.0	34.80	27.0	177.0	-3.70		124.0	8.0
<b>Station 32 Indian Ocean: 11 samples (1977-1984); 06°-08°S, 76°-79°E</b>													
S32.	TO-00008	744	770328	-6.58	77.00	7.0	34.18	29.8	171.0	-4.90		120.7	7.0
S32.	TO-00016	764	770820	-6.58	77.00	7.0	35.00	28.3	139.0	-6.70		93.7	5.0
S32.	TO-00026	786	780118	-7.00	77.00	7.0	34.19	29.0	154.0	-5.20		104.6	10.0
S32.	TR-00093	829	781118	-7.00	76.67	9.5	34.76	29.3	138.0	-5.40		90.6	6.0
S32.	TR-00102	843	790220	-7.00	78.00	9.5	34.21	30.5	137.0	-7.20		93.5	7.0
S32.	TB-00171	931	801028	-7.00	77.72	10.3	33.97	28.1	137.0	-0.30		78.4	7.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S32.	TB-00204	990	811215	-7.17	77.10	8.5	34.86	28.0	142.0	-2.90		88.3	5.0
S32.	TB-00215	1004	820323	-6.85	78.03	10.0	34.48	28.6	162.0	-1.00		103.1	5.0
S32.	TQ-00249	1078	830827	-6.53	77.82	9.0	35.02	30.0	143.0	-4.80		93.5	5.0
S32.	TQ-00281	1120	840613	-6.00	77.00	8.0	35.04	30.0	156.0	0.90		92.6	4.4
S32.	TQ-00304	1148	841227	-7.37	78.92	8.0	33.92	30.2	153.0	-0.70		93.7	5.2
<b>Station 33 Indian Ocean: 1 sample (1977); 12°29'S, 77°00'E</b>													
S33.	TO-00021	775	771103	-12.48	77.00	7.0	35.04	27.8	142.0	-5.20		93.7	6.0
<b>Station 34 Indian Ocean: 7 samples (1976-1984); 13°-19°S, 84°-90°E</b>													
S34.	SV-00286	710	760805	-15.00	88.70	7.0	34.56	26.0	208.0	-6.30		159.9	12.0
S34.	TO-00020	775	771102	-18.00	85.92	7.0	34.99	25.7	161.0	-4.60		110.7	7.0
S34.	TO-00030	795	780320	-18.67	86.80	7.0	35.02	27.5	172.0	-5.60		123.6	11.0
S34.	TR-00092	829	781116	-18.08	89.33	9.5	34.42	26.5	144.0	-5.70		96.6	11.0
S34.	TR-00124	869	790826	-18.00	89.33	9.8	34.80	23.1	159.0	-8.00		115.5	10.0
S34.	TB-00194#	976	810909	-18.00	84.00	10.0	34.68	21.0	154.0	-4.60		103.3	7.0
S34.	TQ-00280#	1120	840611	-13.87	88.18	8.0	-999.90	28.8	170.0	1.00		105.9	5.2
<b>Station 35 Indian Ocean: 10 samples (1976-1984); 16°-19°S, 91°-95°E</b>													
S35.	TO-00002B	721	761023	-18.17	91.00	8.0	34.99	23.0	158.0	-7.70		114.9	9.0
S35.	TO-00002A	721	761023	-18.17	91.00	8.0	35.02	23.0	183.0	-0.90		122.9	12.0
S35.	TO-00009	744	770331	-18.00	91.00	7.0	35.12	26.4	192.0	-4.80		140.7	7.0
S35.	TO-00017	765	770823	-18.00	91.00	7.0	35.91	24.3	175.0	-5.10		124.7	9.0
S35.	TO-00027	786	780120	-18.00	91.83	7.0	-999.90	27.5	162.0	-3.10		107.6	8.0
S35.	TR-00101	842	790217	-18.00	93.78	9.5	34.75	27.0	180.0	-6.30		132.5	7.0
S35.	TB-00170	930	801025	-18.00	93.77	10.3	34.42	25.2	155.0	-5.80		107.4	5.0
S35.	TB-00203	989	811213	-18.00	94.12	8.5	34.47	23.4	160.0	-1.00		101.3	6.0
S35.	TQ-00248	1078	830825	-16.17	91.50	9.0	34.51	28.0	-999.90	-999.90		-999.9	-999.9
S35.	TQ-00303	1148	841225	-18.08	94.43	8.0	-999.90	26.1	180.0	0.50		116.8	3.3

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 36 Indian Ocean: 3 samples (1977, 1990); 31°-37°S, 40°-42°E</b>													
S36.	TR-00048#	772	771016	-31.40	41.53	9.5	35.50	22.0	156.0	-6.80		110.7	7.0
S36.	TQ-00475	1422	900329	-36.70	40.00	9.8	35.60	21.0	164.0	0.00		101.7	4.7
S36.	TQ-00505	1461	901230	-36.92	40.00	10.5	35.58	18.9	166.0	0.70		102.1	4.6
<b>Station 37 Indian Ocean: 15 samples (1977-1985); 30°-32°S, 60°-67°E</b>													
S37.	TR-00007	732	770103	-31.72	65.50	9.5	35.76	23.5	162.0	-9.10		121.7	8.0
S37.	TR-00019#	746	770411	-31.60	60.50	9.0	35.46	24.6	177.0	-8.80		121.7	9.0
S37.	TR-00031	758	770709	-32.00	65.00	8.0	35.41	21.0	186.0	-5.70		136.7	11.0
S37.	TR-00047	772	771013	-30.00	66.20	9.5	35.74	20.3	167.0	-6.90		121.7	6.0
S37.	TR-00055	786	780119	-31.48	65.00	10.0	35.67	23.0	163.0	-3.50		109.6	7.0
S37.	TR-00067	800	780424	-31.82	65.00	9.0	35.72	21.5	182.0	-4.50		130.6	7.0
S37.	TR-00079	814	780804	-30.05	65.00	10.0	35.58	19.8	190.0	-5.50		139.6	10.0
S37.	TR-00115	856	790521	-31.60	65.00	9.5	35.40	21.0	195.0	-6.60		147.5	10.0
S37.	TR-00135	883	791129	-31.47	65.00	9.8	35.74	20.9	199.0	-6.90		161.5	5.0
S37.	TR-00149	897	800306	-31.70	65.00	9.5	35.59	23.9	189.0	-6.70		141.4	5.0
S37.	TR-00157	912	800618	-31.35	65.00	10.1	35.58	20.1	193.0	-6.70		146.4	4.0
S37.	TR-00181	945	810208	-31.42	65.00	10.1	35.78	23.4	199.0	-0.30		136.3	8.0
S37.	TQ-00278	1113	840426	-30.75	63.87	9.0	-999.90	22.0	196.0	5.00		132.1	4.2
S37.	TQ-00288	1128	840808	-30.68	65.00	10.7	35.73	18.5	199.0	0.40		135.3	4.4
S37.	TQ-00311	1155	850212	-30.83	65.28	9.5	35.58	23.3	209.0	4.00		144.0	3.1
<b>Station 38 Indian Ocean: 5 samples (1977, 1984-1991); 30°-42°S, 77°-85°E</b>													
S38.	TR-00046#	772	771011	-30.00	85.00	9.5	35.95	19.0	174.0	-7.60		129.7	10.0
S38.	TQ-00267#	1099	840121	-41.50	77.82	9.5	35.02	16.0	-999.9	-999.90		-999.9	-999.9
S38.	TQ-00400	1282	870724	-39.72	85.00	10.0	35.12	13.2	-999.9	-999.90		-999.9	-999.9
S38.	TQ-00477	1423	900403	-36.50	85.00	9.8	35.78	16.6	152.0	0.50		89.6	3.8
S38.	TQ-00507	1462	910103	-38.43	85.00	10.4	35.11	16.8	159.0	0.90		95.1	3.9



Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 39 Indian Ocean: 12 samples (1976-1984); 27°-31°S, 106°-113°E</b>													
S39.	SV-00285	709	760801	-30.00	108.37	7.0	-999.90	19.0	217.0	-5.20		165.9	9.0
S39.	TO-00003B	722	761025	-30.00	107.33	8.0	35.44	20.4	173.0	-9.10		131.9	11.0
S39.	TO-00003A	722	761025	-30.00	107.33	8.0	35.44	20.6	211.0	-2.50		152.9	11.0
S39.	TO-00010	744	770403	-30.00	107.35	7.0	35.75	22.3	190.0	-5.70		140.7	14.0
S39.	TO-00018	765	770826	-30.00	108.67	7.0	35.70	19.7	181.0	-5.20		131.7	7.0
S39.	TO-00019	774	771030	-30.00	106.50	7.0	35.82	19.5	128.0	-6.00		81.7	5.0
S39.	TO-00028	787	780123	-30.00	108.28	7.0	35.92	20.5	180.0	-5.20		129.6	8.0
S39.	TO-00029	794	780318	-30.00	106.33	7.0	35.97	23.0	203.0	-6.50	*	154.6	7.0
S39.	TR-00091#	829	781113	-30.30	111.17	9.5	35.11	22.3	180.0	-5.30		129.6	9.0
S39.	TR-00100#	842	790215	-30.00	112.50	9.5	35.65	24.0	180.0	-8.00		136.5	9.0
S39.	TR-00123	869	790823	-28.07	108.00	9.8	35.62	20.3	169.0	-8.80		125.5	8.0
S39.	TQ-00302	1143	841123	-27.18	108.08	8.0	34.23	22.7	186.0	0.30		123.0	4.2
<b>Station 41 Indian Ocean: 18 samples (1979-1991); 31°-36°S, 107°-109°E</b>													
S41.	TR-00134	882	791124	-31.98	108.00	9.8	35.91	18.9	198.0	-5.90		148.5	6.0
S41.	TR-00148	891	800127	-34.50	108.00	9.5	35.91	19.9	202.0	-7.30		155.4	6.0
S41.	TR-00156	911	800613	-31.92	108.00	10.2	35.93	18.2	183.0	-7.90		139.4	5.0
S41.	TB-00180	939	801227	-33.92	107.30	10.2	35.22	20.0	151.0	-4.80		101.4	6.0
S41.	TB-00193	971	810803	-33.55	108.00	10.3	35.62	15.0	180.0	-5.00		129.3	6.0
S41.	TB-00222	1012	820520	-35.08	108.00	9.5	-999.90	14.2	161.0	-3.00		106.7	4.7
S41.	TQ-00247	1073	830721	-33.38	108.38	10.0	35.58	18.2	149.0	-1.50		91.5	6.7
S41.	TQ-00279	1097	840105	-31.72	107.58	9.0	-999.90	20.5	199.0	0.70		134.2	4.4
S41.	TQ-00289	1129	840813	-31.75	108.08	10.7	-999.90	16.3	198.0	0.50		133.9	4.2
S41.	TQ-00301	1143	841119	-33.15	108.68	9.5	35.19	19.0	188.0	0.80		123.3	4.5
S41.	TQ-00312	1155	850217	-31.77	108.00	9.5	35.94	21.4	195.0	0.20		131.2	4.4
S41.	TQ-00323	1171	850606	-32.68	108.00	10.8	35.57	16.7	181.0	0.30		118.2	4.5
S41.	TQ-00336	1187	850926	-32.45	107.97	10.5	-999.90	17.2	185.0	0.20		121.6	4.1
S41.	TQ-00347	1205	860128	-34.17	108.00	9.2	36.01	13.5	187.0	-0.70		125.2	6.8
S41.	TQ-00373	1244	861030	-32.93	108.00	9.5	34.47	15.4	179.0	-0.30		117.3	6.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S41.	TQ-00401	1282	870726	-34.42	108.00	10.0	35.85	17.3	-999.9	-999.90		-999.9	-999.9
S41.	TQ-00478	1423	900405	-33.17	108.00	9.7	35.78	20.8	154.0	-0.10		92.7	3.5
S41.	TQ-00508	1462	910106	-33.45	108.00	10.4	35.85	19.7	161.0	1.70		95.0	4.6
<b>Station 42 Indian Ocean: 2 samples (1977, 1979); 40°00'N, 31°-36°E</b>													
S42.	TR-00030	753	770530	-40.00	36.00	8.0	35.52	18.8	181.0	-6.50		134.7	7.0
S42.	TR-00099I	836	790107	-40.00	31.50	9.5	35.39	16.9	136.0	-6.30		90.5	7.0
<b>Station 43 Indian Ocean: (includes Station 40), 28 samples (1976-1991); 34°-42°S, 62°-68°E</b>													
S43.	TR-00006	726	761125	-40.13	65.05	10.0	35.36	15.7	140.0	-9.40		100.9	6.0
S43.	TR-00018	740	770304	-40.07	66.67	9.5	35.32	17.3	165.0	-8.20		122.7	8.0
S43.	TR-00043	766	770903	-36.30	63.30	9.5	35.41	14.8	126.0	-7.40		83.7	10.0
S43.	TR-00054	780	771206	-40.37	68.00	9.0	35.36	15.6	117.0	-5.30		69.7	10.0
S43.	TR-00066	794	780316	-37.03	65.00	9.5	35.38	19.5	169.0	-3.30		115.6	7.0
S43.	TR-00078#	807	780615	-34.25	65.00	9.5	35.53	17.9	164.0	-5.40		115.6	6.0
S43.	TR-00090	823	781003	-36.85	65.00	9.5	35.37	15.8	143.0	-6.30		96.6	8.0
S43.	TR-00110#	850	790410	-41.25	65.00	9.5	-999.90	13.0	105.0	-7.20		61.5	11.0
S43.	TR-00133	877	791016	-40.00	65.00	9.5	35.18	13.9	149.0	-6.60		103.5	6.0
S43.	TR-00147	891	800123	-40.10	65.00	9.5	35.43	16.1	170.0	-5.80		121.4	5.0
S43.	TB-00179	937	801213	-37.98	65.00	10.3	35.39	17.1	153.0	-4.40		102.4	5.0
S43.	TB-00192	970	810728	-38.77	65.00	10.0	35.34	13.4	152.0	-5.00		102.3	7.0
S43.	TB-00202	983	811027	-38.97	64.67	10.5	-999.90	14.0	149.0	-1.50		92.3	8.0
S43.	TB-00212	996	820131	-37.42	65.08	7.5	35.16	17.0	156.0	-4.30		106.1	6.0
S43.	TB-00229	1024	820814	-35.33	64.95	10.5	-999.90	16.2	133.0	-1.20		75.6	11.8
S43.	TB-00236	1038	821118	-39.10	65.27	9.4	35.77	13.0	159.0	-5.20		109.8	5.1
S43.	TQ-00246#	1073	830721	-35.00	62.33	10.0	35.54	18.5	-999.9	-999.90		-999.9	-999.9
S43.	TQ-00256	1084	831008	-36.88	65.00	10.5	-999.90	15.8	158.0	-7.00		111.9	4.7
S43.	TQ-00300	1142	841114	-36.83	64.83	9.5	-999.90	18.5	198.0	-1.20		137.1	5.1
S43.	TQ-00322	1170	850601	-35.00	65.00	10.8	35.19	18.5	175.0	0.30		112.0	4.4
S43.	TQ-00335	1186	850921	-34.83	65.33	10.5	35.37	17.0	160.0	-0.30		99.4	5.4

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S43.	TQ-00346	1204	860122	-39.73	65.00	9.2	35.57	15.8	134.0	0.00		74.0	7.2
S43.	TQ-00358	1223	860607	-35.93	65.87	8.0	35.57	17.5	175.0	0.10		112.2	6.5
S43.	TQ-00372	1243	861024	-38.25	65.00	9.5	35.52	14.6	186.0	-0.80		124.8	13.3
S43.	TQ-00399	1282	870722	-40.42	67.00	10.3	35.35	14.1	-999.9	-999.90		-999.9	-999.9
S43.	TQ-00392	1282	870722	-40.42	67.00	10.3	36.54	14.1	-999.9	-999.90		-999.9	-999.9
S43.	TQ-00476	1422	900401	-36.50	67.00	9.8	35.48	19.6	163.0	0.20		99.8	3.9
S43.	TQ-00506#	1462	910102	-39.17	67.00	10.4	35.28	17.7	164.0	0.90		99.2	3.9
<b>Station 44 Indian Ocean: 8 samples (1977-1986); 37°-46°S, 105°-110°E</b>													
S44.	TR-00045	767	770908	-37.75	107.55	9.5	35.39	14.0	169.0	-7.90		126.7	6.0
S44.	TR-00044	767	770908	-37.67	105.00	9.5	35.31	13.6	174.0	-7.30		129.7	10.0
S44.	TB-00169	925	800916	-39.45	107.50	9.8	35.18	10.8	149.0	-8.20		107.4	6.0
S44.	TB-00213	997	820204	-38.25	107.80	10.0	35.15	18.0	139.0	-3.60		86.1	4.0
S44.	TB-00237	1039	821122	-39.17	108.02	9.4	35.43	13.5	167.0	-2.60		110.9	5.2
S44.	TQ-00257	1086	831018	-38.05	108.00	10.5	-999.90	12.7	137.0	-6.70		91.5	4.9
S44.	TQ-00268#	1100	840124	-45.28	109.95	9.5	34.73	11.5	-999.9	-999.90		-999.9	-999.9
S44.	TQ-00359	1224	860611	-37.58	108.00	8.0	35.41	14.9	147.0	0.20		85.2	6.3
<b>Station 45 Indian Ocean: 1 samples (1979); 45°00'S, 65°00'E</b>													
S45.	TR-00099H	837	790110	-45.00	65.00	9.5	34.89	14.1	129.0	-5.60		81.5	10.0
<b>Station 51 Pacific Ocean: 1 sample (1970); 44°22'N, 170°00'W</b>													
S51.	SV-00132	381	700413	44.37	-170.00	-999.9	33.65	-999.9	92.0	2.90		29.6	8.0
<b>Station 52 Pacific Ocean: 11 samples (1966-1970); 44°-47°N, 123°-125°W</b>													
S52.	SV-00022	196	661001	45.00	-124.00	-999.9	34.44	-999.9	183.0	2.90		124.1	9.0
S52.	SV-00040	227	670505	46.33	-124.80	8.0	30.54	11.0	339.0	1.90		280.9	9.0
S52.	SV-00049	242	670817	45.10	-124.60	7.0	30.73	20.0	212.0	1.70		154.9	7.0
S52.	SV-00062	254	671110	45.10	-124.80	-999.9	32.92	13.0	306.0	-0.10		238.4	12.0
S52.	SV-00068	269	680222	45.67	-124.90	6.5	31.02	9.0	230.0	0.80		174.8	9.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag I3 (*)	CRC14 (‰)	SIGMA
S52.	SV-00077	285	680611	44.83	-123.80	8.0	31.04	12.0	186.0	2.70		119.8	6.0
S52.	SV-00085	298	680914	45.67	-124.70	7.0	-999.90	16.0	255.0	0.50		188.8	6.0
S52.	SV-00092	312	681217	46.33	-124.80	5.5	32.72	10.0	342.0	1.20	*	269.8	10.0
S52.	SV-00103	331	690501	44.83	-124.90	7.5	33.56	19.0	286.0	1.20	*	217.7	14.0
S52.	SV-00124	373	700221	45.03	-124.40	6.3	32.05	11.0	270.0	1.10		202.6	8.0
S52.	SV-00140	386	700521	46.20	-124.80	7.0	-999.90	12.0	265.0	1.10		197.6	8.0
<b>Station 53 Pacific Ocean: 12 samples (1970, 1984-1994); 39°-45°N, 150°W</b>													
S53.	SV-00133	381	700415	41.87	-150.00	5.0	-999.90	9.0	165.0	0.80		102.6	8.0
S53.	BT-00022	1110	840404	39.97	-150.00	10.0	33.59	10.6	152.0	-0.60		92.3	4.9
S53.	BT-00034	1122	840625	43.33	-150.00	10.0	33.00	11.6	139.0	0.00		78.2	5.1
S53.	BT-00046	1136	841005	40.58	-150.00	9.7	32.94	17.4	-999.9	-999.90		-999.9	-999.9
S53.	TQ-00326	1181	850815	43.13	-150.00	9.5	32.90	15.4	136.0	0.00		76.0	5.1
S53.	BT-00051	1191	851026	42.77	-150.00	9.5	33.03	16.0	176.0	-0.30		114.0	6.0
S53.	BT-00072	1225	860617	43.38	-150.00	8.5	32.99	10.5	139.0	-1.40		81.5	3.7
S53.	TQ-00363	1232	860806	44.73	-150.10	9.5	32.70	16.0	134.0	1.10		71.6	5.6
S53.	TQ-00388	1277	870616	41.00	-150.00	10.1	33.26	10.8	-999.9	-999.90		-999.9	-999.9
S53.	TQ-00455	1371	890404	39.50	-150.00	9.8	33.45	12.1	153.0	0.60		90.2	4.9
S53.	TQ-00522	1488	910706	42.17	-150.00	10.4	33.09	17.7	123.0	-2.60		67.9	4.4
S53.	TQ-00588	1645	940707	43.42	-150.20	10.3	33.11	16.0	105.0	-1.40		48.2	4.3
<b>Station 54 Pacific Ocean: 3 samples (1969-1970); 38°-42°N, 123°-125°W</b>													
S54.	SV-00108	344	690802	42.03	-124.00	7.0	31.12	15.8	218.0	-1.80		159.7	8.0
S54.	SV-00120	357	691028	38.60	-123.60	5.5	-999.90	14.0	121.0	1.80		59.7	11.0
S54.	SV-00143	399	700823	42.03	-124.70	7.0	33.57	12.0	96.0	1.60		36.6	8.0
<b>Station 55 Pacific Ocean: 6 samples (1970-1973, 1988-1993); 38°-43°N, 160°-164°E</b>													
S55.	SV-00158	409	701026	39.75	160.00	9.0	36.62	22.0	164.0	1.10		102.6	9.0
S55.	SV-00235	548	730627	41.57	160.00	7.0	33.72	14.0	137.0	1.50		75.2	8.0
S55.	TQ-00419	1310	880202	42.25	160.00	10.3	33.72	5.0	86.0	-2.50		32.6	4.5

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S55.	TQ-00453	1370	890331	40.00	160.00	10.0	-999.90	-999.9	115.0	1.30		52.5	3.8
S55.	TQ-00520	1488	910702	40.00	160.00	10.4	34.01	14.6	136.0	-1.70		78.9	3.7
S55.	TQ-00570#	1606	931004	38.18	163.63	10.4	34.47	20.5	-999.9	-999.90		-999.9	-999.9
<b>Station 56 Pacific Ocean: 18 samples (1970-1973, 1983-1994); 39°-48°N, 178°W-178°E</b>													
S56.	SV-00156	409	701028	40.18	-180.00	9.0	35.28	20.0	149.0	2.20		84.6	8.0
S56.	SV-00184	448	710729	39.52	179.50	9.0	34.01	19.0	179.0	3.90		109.5	11.0
S56.	SV-00236	548	730629	40.03	-180.00	7.0	34.29	15.0	162.0	2.10		97.2	10.0
S56.	BT-00009	1095	831219	39.15	180.00	6.0	34.22	13.0	155.0	-0.60		95.1	5.2
S56.	BT-00021	1109	840401	39.27	180.00	10.0	34.31	11.0	143.0	-1.50		85.9	4.8
S56.	BT-00033	1121	840624	43.78	180.00	10.0	33.65	9.9	106.0	-0.80		48.8	5.0
S56.	BT-00045	1136	841002	41.83	180.00	9.7	33.67	14.5	142.0	0.80		79.3	6.1
S56.	TQ-00325	1177	850715	43.65	180.00	9.5	33.46	13.0	120.0	-3.10		66.9	6.0
S56.	BT-00050#	1191	851024	47.10	180.00	9.5	32.94	10.0	89.0	0.20		30.1	4.5
S56.	BT-00071	1224	860614	43.93	180.00	8.5	33.30	8.0	108.0	-1.70		52.0	4.7
S56.	TQ-00362	1232	860804	46.25	180.00	9.5	32.98	12.0	69.0	0.30		11.0	7.2
S56.	TQ-00387	1271	870505	46.60	180.00	10.2	33.10	4.5	-999.9	-999.90		-999.9	-999.9
S56.	TQ-00404#	1290	870918	47.67	180.00	9.8	32.92	10.1	-999.9	-999.90		-999.9	-999.9
S56.	TQ-00420	1310	880204	41.08	180.00	10.3	33.91	9.0	99.0	-1.30		42.7	4.0
S56.	TQ-00454	1370	890402	40.00	180.00	10.0	-999.90	11.6	145.0	0.00	*	83.7	4.8
S56.	TQ-00521	1488	910703	41.83	-180.00	10.4	33.61	14.2	136.0	1.10		72.9	3.6
S56.	TQ-00549	1527	920403	39.12	178.80	10.3	34.42	11.1	161.0	-2.20		103.2	3.9
S56.	TQ-00589	1645	940705	43.95	-178.10	10.3	33.73	12.2	-999.9	-999.90		-999.9	-999.9
<b>Station 57 Pacific Ocean: 1 sample (1971); 39°35'N, 160°00'W</b>													
S57.	SV-00183	448	710727	39.58	-160.00	-999.9	34.44	19.0	183.0	2.60		116.5	10.0
<b>Station 58 Pacific Ocean: 13 samples (1971, 1983-1992); 34°-37°N, 149°-153°E</b>													
S58.	SV-00185	448	710731	36.95	149.82	9.0	34.14	25.0	267.0	4.60		191.5	8.0
S58.	BT-00008	1094	831217	35.92	150.00	6.0	34.86	20.0	221.0	-1.00		158.8	5.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (decimal degrees)	Long (decimal degrees)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S58.	BT-00020	1109	840401	34.82	150.00	10.0	34.91	16.0	193.0	-1.00		131.8	5.0
S58.	BT-00044	1135	840930	36.60	150.60	9.7	-999.90	25.5	196.0	-0.30		133.9	5.3
S58.	TQ-00337	1194	851111	34.80	150.32	10.0	-999.90	23.8	211.0	0.00		146.8	9.4
S58.	BT-00058	1209	860301	34.75	150.00	9.0	34.78	12.5	140.0	-0.50		80.5	6.3
S58.	BT-00060	1210	860307	36.00	150.00	9.0	34.09	12.8	158.0	0.10		95.9	3.9
S58.	TQ-00348	1211	860313	35.70	150.00	9.8	34.86	13.5	177.0	-0.10		114.5	5.9
S58.	BT-00070	1224	860612	35.43	150.00	8.5	34.63	15.6	141.0	-1.30		83.5	4.8
S58.	TQ-00374	1251	861217	35.75	151.00	9.0	34.47	17.1	192.0	-0.30		129.2	4.8
S58.	TQ-00479	1429	900518	35.63	150.00	11.0	34.76	19.1	187.0	-0.10		124.2	3.9
S58.	TQ-00498	1450	901009	36.95	149.18	10.7	33.86	21.6	174.0	1.10		109.1	3.6
S58.	TQ-00547	1527	920401	34.67	152.47	10.4	34.75	17.1	173.0	-0.50		111.0	3.9

**Station 59** Pacific Ocean: 10 samples (1973-1974, 1987-1994); 34°-37°N, 158°-162°E

S59.	SV-00223	523	730102	34.32	160.43	5-10	36.61	-999.9	204.0	5.50		129.2	10.0
S59.	SV-00227	529	730218	34.13	160.00	6.5	34.60	15.0	174.0	-0.40		114.2	8.0
S59.	SV-00251	583	740303	34.12	158.67	7.5	34.41	14.0	139.0	-0.10		80.1	8.0
S59.	TQ-00434	1329	880619	36.18	160.00	10.1	34.60	15.4	158.0	-1.40		99.3	3.5
S59.	TQ-00466	1410	900101	35.50	160.00	9.2	34.49	17.5	166.0	0.90		101.1	4.3
S59.	TQ-00480	1429	900519	36.15	160.00	11.0	34.54	16.2	155.0	-0.20		93.3	4.5
S59.	TQ-00496	1449	901004	36.93	159.95	10.7	34.24	25.6	165.0	0.80		101.1	4.6
S59.	TQ-00534	1508	911119	34.00	160.50	11.0	34.39	23.3	162.0	0.20		99.5	4.7
S59.	TQ-00548	1527	920402	34.92	161.77	10.4	34.56	16.0	159.0	-3.50		104.9	4.0
S59.	TQ-00579	1625	940220	34.50	161.30	10.7	34.72	17.0	-999.9	-999.90		-999.9	-999.9

**Station 61** Pacific Ocean: 13 samples (1974-1975, 1985-1994); 34°-39°N, 179°W-179°E

S61.	SV-00252	584	740305	37.28	-179.80	7.5	34.42	14.0	80.0	-0.40		24.1	8.0
S61.	SV-00271#	649	750603	34.57	-174.40	6.0	34.37	18.0	230.0	21.70		118.0	13.0
S61.	TQ-00338	1194	851114	34.80	179.58	10.0	34.25	21.0	197.0	-0.50		134.4	6.3
S61.	BT-00059	1210	860305	34.42	180.00	9.0	34.65	13.8	178.0	0.10		114.8	4.0
S61.	TQ-00349	1211	860316	34.27	180.00	9.7	34.75	15.3	190.0	0.10		126.5	5.3

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S61.	TQ-00375	1251	861219	38.00	180.00	9.0	34.40	13.9	177.0	0.10		114.6	6.0
S61.	TQ-00435	1330	880620	35.75	180.00	10.1	34.54	19.3	149.0	-1.70		91.7	4.2
S61.	TQ-00467	1410	900103	34.50	180.00	9.2	34.70	18.3	176.0	0.60		111.8	3.6
S61.	TQ-00481	1430	900521	37.53	180.00	10.8	34.47	15.3	162.0	-0.90		101.3	3.8
S61.	TQ-00497	1449	901005	36.98	179.87	10.7	34.46	20.5	175.0	0.20		112.0	3.7
S61.	TQ-00560	1587	930524	37.00	-179.00	10.3	34.43	13.0	-999.9	-999.90		-999.9	-999.9
S61.	TQ-00571	1606	931006	38.23	179.98	10.4	34.31	17.5	-999.9	-999.90		-999.9	-999.9
S61.	TQ-00580	1626	940222	34.50	180.00	10.7	34.62	15.0	-999.9	-999.90		-999.9	-999.9

**Station 62** Pacific Ocean: 17 samples (1973-1975, 1983-1993); 32°-39°N, 146°-152°W

S62.	SV-00225	523	730106	32.65	-150.80	5-10	34.21	-999.9	306.0	5.20		226.2	11.0
S62.	SV-00237	548	730701	34.93	-150.00	7.0	34.28	20.0	229.0	2.70		159.2	10.0
S62.	SV-00253	584	740308	33.73	-150.20	7.5	34.29	16.0	209.0	1.80		142.1	10.0
S62.	SV-00257	602	740711	34.07	-150.00	8.0	34.58	23.0	248.0	2.30		178.1	9.0
S62.	SV-00272	649	750606	33.68	-150.30	6.0	34.07	22.0	-999.9	-999.90		-999.9	-999.9
S62.	BT-00010	1095	831222	38.00	-150.00	6.0	34.02	14.5	167.0	-1.60		108.7	4.6
S62.	TQ-00339#	1195	851118	37.40	-146.60	10.0	34.09	19.3	172.0	-0.70		111.6	6.2
S62.	TQ-00350	1218	860428	33.88	-150.00	9.7	34.58	15.6	179.0	0.40		115.3	4.8
S62.	TQ-00376	1252	861222	36.20	-150.00	9.0	34.20	17.1	180.0	-0.10		117.5	5.7
S62.	TQ-00421	1310	880207	38.25	-150.00	10.3	33.58	11.5	147.0	-1.10		88.6	3.6
S62.	TQ-00436	1330	880623	35.77	-150.00	10.1	34.20	18.4	-999.9	-999.90		-999.9	-999.9
S62.	TQ-00468	1410	900106	34.50	-150.00	9.2	34.41	17.7	178.0	1.10		112.4	4.0
S62.	TQ-00482	1430	900524	36.37	-150.00	10.8	34.00	16.6	164.0	-1.50		105.2	3.7
S62.	TQ-00536	1508	911124	33.55	-150.00	11.0	34.40	21.7	159.0	-3.10		103.4	4.4
S62.	TQ-00550	1528	920407	38.47	-149.60	10.5	33.66	11.0	139.0	-4.50		87.6	3.9
S62.	TQ-00561#	1587	930527	37.00	-152.00	10.3	33.79	13.3	-999.9	-999.90		-999.9	-999.9
S62.	TQ-00572	1606	931008	37.28	-150.40	10.4	33.91	21.0	-999.9	-999.90		-999.9	-999.9

**Station 63** Pacific Ocean: 20 samples (1970, 1983-1994); 34°-39°N, 129°-131°W

S63.	SV-00134	381	700418	34.58	-130.00	5.0	-999.90	14.0	319.0	4.00		241.6	9.0
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Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S63.	BT-00011	1095	831225	34.33	-130.00	6.0	33.69	16.7	203.0	0.20		138.8	4.9
S63.	BT-00023	1110	840405	36.60	-130.50	10.0	33.30	14.8	201.0	0.50		136.1	4.9
S63.	BT-00035	1122	840627	37.72	-130.00	10.0	33.30	18.3	196.0	0.30		131.8	5.2
S63.	BT-00047	1136	841007	36.37	-130.00	9.7	33.23	20.1	-999.9	-999.90		-999.9	-999.9
S63.	BT-00052	1192	851029	38.25	-130.00	9.5	32.94	17.0	166.0	-1.00		105.9	6.2
S63.	BT-00061	1210	860309	34.88	-130.00	9.0	33.48	16.5	180.0	0.70		115.8	4.6
S63.	BT-00073	1225	860619	38.13	-130.00	8.5	33.22	17.0	163.0	0.40		100.8	5.1
S63.	TQ-00406	1291	870923	38.43	-130.00	9.8	33.23	18.7	-999.9	-999.90		-999.9	-999.9
S63.	TQ-00422	1311	880209	35.70	-130.00	10.3	33.07	14.0	160.0	-0.30		99.1	3.7
S63.	TQ-00437	1330	880625	34.17	-130.00	10.1	33.88	19.5	-999.9	-999.90		-999.9	-999.9
S63.	TQ-00456	1371	890407	36.08	-130.00	9.8	-999.90	14.6	158.0	0.00	*	96.5	3.9
S63.	TQ-00469	1411	900108	34.50	-130.00	9.2	33.76	17.7	164.0	1.20		99.2	3.7
S63.	TQ-00483	1430	900526	34.65	-130.00	10.8	33.31	16.4	155.0	-1.00		95.1	3.7
S63.	TQ-00499	1450	901011	35.33	-129.80	10.7	-999.90	20.1	153.0	1.40		87.8	4.3
S63.	TQ-00523	1488	910706	37.97	-130.00	10.4	33.19	15.4	139.0	-0.10		78.4	4.6
S63.	TQ-00537	1509	911126	34.17	-129.50	11.0	34.09	17.8	-999.9	-999.90		-999.9	-999.9
S63.	TQ-00551	1528	920409	35.82	-130.80	10.3	33.31	14.6	148.0	1.20		83.3	3.7
S63.	TQ-00573	1606	931010	35.37	-130.90	10.4	33.44	19.0	134.0	-2.40	*	78.0	4.4
S63.	TQ-00582	1626	940227	34.50	-130.70	10.6	-999.90	15.5	-999.9	-999.90		-999.9	-999.9
<b>Station 64 Pacific Ocean: 1 sample (1973); 29°46'N, 150°E</b>													
S64.	SV-00245	565	731024	29.77	150.00	7.0	35.67	23.0	284.0	4.90		206.2	8.0
<b>Station 65 Pacific Ocean: 4 samples (1971-1973); 29°-32°N, 159°-160°E</b>													
S65.	SV-00171	428	710313	29.83	160.00	7.0	34.93	19.0	183.0	1.70		118.5	8.0
S65.	SV-00199	474	720124	29.48	159.70	7.0	34.78	20.0	216.0	1.90		149.3	8.0
S65.	SV-00214	483	720328	29.00	159.00	7.5	34.86	20.0	207.0	4.90		133.3	10.0
S65.	SV-00243	564	731019	32.03	160.00	7.0	34.46	25.0	234.0	1.50		167.2	8.0



Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 66 Pacific Ocean: 4 samples (1973, 1991); 30°-34°N, 179°-180°E</b>													
S66.	SV-00224	523	730104	33.93	179.67	6.0	34.68	-999.9	210.0	1.10		145.2	10.0
S66.	SV-00228	530	730220	33.08	180.00	6.5	34.58	16.0	173.0	1.80		109.2	8.0
S66.	SV-00244	564	731021	30.17	180.00	7.0	35.77	25.0	266.0	4.90		189.2	10.0
S66.	TQ-00535	1508	911120	33.45	180.00	11.0	34.50	19.6	165.0	-4.50		112.9	5.4
<b>Station 67 Pacific Ocean: 3 samples (1971-1972); 20°-27°N, 179°W-175°E</b>													
S67.	SV-00172	429	710315	20.67	180.00	7.0	34.93	19.0	197.0	2.20		130.5	8.0
S67.	SV-00200	474	720127	26.92	-179.70	7.0	35.20	21.0	237.0	2.10		168.3	8.0
S67.	SV-00213	482	720326	25.00	175.00	7.5	35.15	20.0	258.0	10.00		169.3	9.0
<b>Station 68 Pacific Ocean: 5 samples (1970-1973, 1994); 25°-31°N, 149°-150°W</b>													
S68.	SV-00157	409	701031	29.72	-150.00	5-10	-999.90	24.0	271.0	1.70		201.6	8.0
S68.	SV-00173	429	710318	27.83	-149.40	7.0	35.26	27.0	265.0	1.40		196.5	8.0
S68.	SV-00201	474	720129	25.83	-150.00	7.0	35.36	22.0	266.0	2.40		195.3	8.0
S68.	SV-00229	530	730223	25.33	-150.00	6.5	35.21	21.0	257.0	21.00		187.2	7.0
S68.	TQ-00581	1626	940225	30.50	-149.80	10.6	34.36	15.3	-999.9	-999.90		-999.9	-999.9
<b>Station 69 Pacific Ocean: 6 samples (1973-1975); 23°-27°N, 120°-122°W</b>													
S69.	SV-00226	524	730109	26.18	-120.60	5-10	34.37	-999.9	222.0	3.00		152.2	10.0
S69.	SV-00238	549	730705	23.95	-120.00	7.0	33.93	21.0	270.0	3.30		196.2	8.0
S69.	SV-00246	565	731027	23.50	-120.00	7.0	34.10	21.0	273.0	6.50		191.2	10.0
S69.	SV-00254	585	740312	24.77	-120.50	7.5	33.84	18.0	254.0	1.80		185.1	7.0
S69.	SV-00258	603	740715	26.12	-120.00	8.0	33.65	20.0	278.0	2.80		205.1	8.0
S69.	SV-00273	650	750610	26.03	-121.40	6.0	33.92	20.0	273.0	12.20		179.0	9.0
<b>Station 70 Pacific Ocean: 5 samples (1970-1972); 19°-23°N, 119°-120°W</b>													
S70.	SV-00135	382	700421	22.23	-120.00	5.0	34.37	20.0	216.0	4.80		142.6	8.0
S70.	SV-00155	385	700511	20.65	-120.00	5-10	-999.90	24.0	246.0	2.20		176.6	8.0
S70.	SV-00174	430	710322	21.33	-120.00	7.0	34.28	20.0	289.0	2.40		217.5	9.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S70.	SV-00186	449	710805	19.67	-120.00	5-10	34.45	24.0	291.0	1.50		221.5	11.0
S70.	SV-00202	475	720204	21.00	-119.20	7.0	34.36	22.0	244.0	2.80		173.3	8.0
Station 71 Pacific Ocean: 1 sample (1972); 18°N, 155°W													
S71.	SV-00212	482	720321	18.00	-155.00	7.5	35.03	26.0	239.0	1.50		171.3	10.0
Station 72 Pacific Ocean: 2 samples (1972-1973); °-17°N, 120°-123°W													
S72.	SV-00211	481	720317	14.00	-123.00	7.5	34.73	24.0	162.0	2.10		97.3	10.0
S72.	SV-00230	531	730226	16.97	-120.00	6.5	33.77	24.0	180.0	2.50		114.2	8.0
Station 73 Pacific Ocean: 20 samples (1966-1970, 1984-1986); °-15°N, 92°-96°W													
S73.	SV-00023	198	661013	14.33	-95.42	5-10	33.90	-999.9	133.0	2.90		68.1	9.0
S73.	SV-00050	243	670827	14.22	-95.35	7.0	33.80	30.0	141.0	2.80		75.9	7.0
S73.	SV-00060	258	671207	14.00	-95.27	7.0	-999.90	28.0	230.0	2.00		161.9	11.0
S73.	SV-00069	272	680311	14.17	-94.92	8.0	34.35	25.0	83.0	1.10		24.8	7.0
S73.	SV-00078	286	680621	14.20	-95.50	8.0	35.01	29.0	153.0	1.30		90.8	7.0
S73.	SV-00086	300	680926	14.17	-95.08	8.0	33.74	29.0	155.0	1.70		91.8	9.0
S73.	SV-00093	316	690116	13.83	-93.08	8.0	-999.90	28.0	163.0	1.60	*	98.7	10.0
S73.	SV-00100	332	690510	14.55	-94.60	8.0	34.37	29.0	181.0	1.60	*	115.7	10.0
S73.	SV-00109	346	690813	14.40	-92.72	7.5	-999.90	30.0	155.0	1.30		92.7	8.0
S73.	SV-00121	358	691108	14.83	-95.17	7.5	-999.90	30.0	106.0	0.10		48.7	10.0
S73.	SV-00125	375	700302	14.42	-95.33	8.0	34.04	25.0	194.0	0.30		132.6	8.0
S73.	SV-00141	387	700531	14.52	-94.53	7.0	34.17	29.0	192.0	1.60		126.6	8.0
S73.	SV-00144	401	700903	14.57	-95.20	7.0	33.17	29.0	149.0	2.60		84.6	8.0
S73.	BT-00012	1096	840101	13.87	-95.00	6.0	34.29	28.2	152.0	0.40		90.4	4.7
S73.	BT-00024	1111	840411	13.85	-95.00	9.9	34.58	28.0	150.0	0.50		88.1	4.9
S73.	BT-00036	1123	840704	13.82	-95.00	10.0	33.89	29.9	146.0	1.20		82.4	4.4
S73.	BT-00048	1137	841014	13.82	-95.00	9.6	33.36	27.9	-999.9	-999.90		-999.9	-999.9
S73.	BT-00053	1193	851104	13.75	-95.00	9.0	33.98	26.6	75.0	0.40		16.4	4.1
S73.	BT-00062	1211	860315	13.63	-95.00	9.0	34.65	28.0	123.0	1.10		61.2	3.5

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long (m)	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S73.	BT-00074	1226	860625	13.80	-95.00	8.0	34.24	29.5	134.0	0.90		71.5	4.1
<b>Station 74 Pacific Ocean: 11 samples (1971, 1989-1994); 0°-4°S, 84°-100°W</b>													
S74.	SV-00190#	457	711001	-4.02	-99.15	6.0	35.26	23.0	130.0	2.20		67.5	7.0
S74.	TQ-00448	1361	890126	-1.10	-89.05	9.9	34.07	26.0	113.0	-0.60		54.9	4.0
S74.	TQ-00461	1401	891105	-0.08	-88.00	9.4	33.44	24.9	109.0	-0.40		50.3	4.5
S74.	TQ-00491	1440	900805	-1.85	-90.00	10.4	34.90	21.9	112.0	0.90		50.1	3.8
S74.	TQ-00515	1480	910509	0.08	-88.00	10.1	34.46	26.8	139.0	0.40		76.9	4.5
S74.	TQ-00529	1499	910918	-0.62	-88.20	10.9	34.32	23.5	-999.9	-999.90		-999.9	-999.9
S74.	TQ-00542	1519	920207	-1.10	-84.10	10.6	33.31	28.0	140.0	-0.10		78.7	3.9
S74.	TQ-00556	1579	930329	-1.50	-90.00	10.0	33.92	28.7	118.0	-5.00		68.2	4.5
S74.	TQ-00565	1597	930807	-0.03	-87.70	10.7	34.16	23.0	121.0	-1.60	*	63.8	3.8
S74.	TQ-00574	1617	931226	-3.00	-93.00	10.3	36.05	24.0	-999.9	-999.90		-999.9	-999.9
S74.	TQ-00587#	1637	940509	-3.60	-94.95	10.0	-999.90	26.5	135.0	0.10		73.2	4.3
<b>Station 75 Pacific Ocean: 5 samples (1970-1972); 13°-15°S, 110°W</b>													
S75.	SV-00136	374	700224	-15.00	-110.00	2.5	36.09	29.0	134.0	3.80		66.6	10.0
S75.	SV-00147	393	700709	-14.72	-110.00	4.0	35.87	28.0	160.0	1.30		97.6	8.0
S75.	SV-00167	412	701118	-15.00	-110.00	4.0	35.92	20.0	141.0	1.70		78.6	8.0
S75.	SV-00191	464	711116	-14.32	-110.00	3.0	-999.90	25.0	165.0	1.60		101.5	7.0
S75.	SV-00219	500	720730	-13.88	-110.00	4.0	35.57	27.0	163.0	9.10		83.3	10.0
<b>Station 76 Pacific Ocean: 1 sample (1977); 14°39'S, 100°00'W</b>													
S76.	TO-00013	755	770613	-14.65	-100.00	7.5	35.83	25.7	134.0	-5.80		87.7	8.0
<b>Station 77 Pacific Ocean: 21 samples (1973-1977, 1987-1994); 13°-23°S, 119°-124°W</b>													
S77.	SV-00231	536	730406	-19.37	-120.00	7.0	36.34	25.0	206.0	2.20		139.2	8.0
S77.	SV-00239	556	730825	-19.10	-119.40	7.0	-999.90	24.0	239.0	2.00		171.2	8.0
S77.	SV-00247	573	731223	-19.43	-120.00	7.0	-999.90	24.0	217.0	3.10		147.2	8.0
S77.	SV-00259	596	740527	-19.50	-120.00	7.0	36.29	24.0	228.0	17.20		125.1	9.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S77.	SV-00263	616	741015	-19.75	-120.00	7.0	36.24	22.0	225.0	8.90		141.1	8.0
S77.	SV-00267	636	750307	-20.00	-120.00	7.0	36.20	26.0	262.0	25.50		138.0	12.0
S77.	SV-00275	659	750814	-19.75	-120.00	7.0	36.35	24.0	210.0	4.80		136.0	7.0
S77.	TO-00005	732	770107	-19.25	-120.00	7.0	36.45	27.8	161.0	-1.10		102.7	13.0
S77.	TQ-00382#	1264	870319	-22.33	-122.10	10.6	35.54	28.2	177.0	-0.70		115.6	3.9
S77.	TQ-00415	1302	871210	-19.17	-120.00	9.5	36.44	26.5	160.0	0.50		97.5	4.4
S77.	TQ-00442	1341	880909	-19.92	-120.00	9.5	36.53	23.5	158.0	-3.10		102.9	5.6
S77.	TQ-00449	1362	890131	-20.27	-120.50	9.5	36.84	27.1	174.0	2.30		106.4	4.4
S77.	TQ-00462	1402	891109	-19.75	-120.30	9.4	36.02	25.7	131.0	0.00		70.0	4.4
S77.	TQ-00492	1441	900809	-19.60	-120.00	10.4	36.44	24.9	174.0	0.80		109.8	3.8
S77.	TQ-00516	1481	910513	-19.50	-119.80	10.1	36.54	27.7	177.0	1.40		110.6	4.4
S77.	TQ-00530	1500	910923	-20.37	-122.00	10.9	36.17	24.8	-999.9	-999.90		-999.9	-999.9
S77.	TQ-00543#	1520	920212	-21.37	-123.40	10.5	35.96	27.2	176.0	-1.80		116.5	3.9
S77.	TQ-00557	1579	930402	-15.50	-120.00	10.0	36.05	29.1	-999.9	-999.90		-999.9	-999.9
S77.	TQ-00566	1598	930812	-15.38	-123.50	10.6	36.18	25.5	139.0	-0.50		78.3	3.9
S77.	TQ-00575	1618	931230	-14.72	-121.80	10.3	36.15	27.3	-999.9	-999.90		-999.9	-999.9
S77.	TQ-00593	1637	940512	-13.98	-120.00	10.0	36.05	28.0	-999.9	-999.90		-999.9	-999.9
<b>Station 78 Pacific Ocean: 1 sample (1970); 26°S, 170°W</b>													
S78.	SV-00170	413	701128	-26.08	-170.00	4.0	35.30	21.0	146.0	1.70		83.6	8.0
<b>Station 79 Pacific Ocean: 5 samples (1970-1972); 13°-27°S, 130°W</b>													
S79.	SV-00137	374	700228	-26.25	-130.00	2.5	35.54	30.0	219.0	2.90		149.6	8.0
S79.	SV-00148#	394	700713	-13.92	-130.00	4.0	35.99	28.0	200.0	1.50		134.6	8.0
S79.	SV-00168	412	701122	-24.83	-130.00	4.0	36.08	28.0	206.0	2.40		138.6	8.0
S79.	SV-00192	464	711120	-24.67	-130.00	3.0	-999.90	26.0	261.0	3.20		188.5	10.0
S79.	SV-00220	501	720803	-25.03	-130.00	4.0	35.55	25.0	235.0	4.30		161.3	8.0
<b>Station 80 Pacific Ocean: 4 samples (1971-1977, 1988); 24°-29°S, 120°W</b>													
S80.	SV-00189	456	710926	-26.25	-120.00	6.0	36.61	24.0	220.0	2.40		151.5	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S80.	SV-00282	688	760302	-29.02	-120.00	7.0	35.41	26.0	227.0	2.10		158.9	7.0
S80.	TO-00012	754	770610	-28.72	-120.00	7.5	35.58	21.2	219.0	-5.60		168.7	7.0
S80.	TQ-00430#	1322	880428	-24.33	-120.00	10.5	36.33	26.0	204.0	0.00		139.9	4.0
<b>Station 81 Pacific Ocean: 25 samples (1970-1975, 1987-1994); 23°-32°S, 149°-162°W</b>													
S81.	SV-00138	375	700302	-31.20	-150.00	2.5	35.65	26.0	220.0	5.50		144.6	8.0
S81.	SV-00149	394	700717	-31.00	-150.00	4.0	36.26	25.0	217.0	1.10		151.6	8.0
S81.	SV-00169	413	701126	-31.00	-150.00	4.0	35.45	24.0	173.0	0.40		111.6	8.0
S81.	SV-00187	449	710802	-29.83	-150.00	5.5	35.49	21.0	206.0	7.20		127.5	11.0
S81.	SV-00193	465	711122	-28.67	-150.00	3.0	35.39	24.0	237.0	1.30		170.5	8.0
S81.	SV-00221	502	720807	-31.42	-150.00	4.0	35.34	19.0	230.0	8.40		147.3	8.0
S81.	SV-00240	557	730829	-29.20	-150.00	7.0	35.84	20.0	217.0	2.00		149.2	12.0
S81.	SV-00248	574	731228	-29.50	-150.00	7.0	35.77	24.0	226.0	3.10		155.2	10.0
S81.	SV-00260	596	740531	-29.33	-150.00	7.0	35.40	22.0	275.0	3.80		200.1	13.0
S81.	SV-00264	616	741019	-29.50	-150.00	7.0	35.48	19.0	250.0	12.00		157.1	13.0
S81.	SV-00276	660	750818	-29.07	-150.00	7.0	-999.90	20.0	212.0	7.50		132.0	10.0
S81.	TQ-00383	1265	870323	-30.25	-152.20	10.5	35.72	24.1	-999.9	-999.90		-999.9	-999.9
S81.	TQ-00416	1303	871214	-30.72	-150.00	9.5	35.77	22.5	185.0	0.60		120.6	4.1
S81.	TQ-00431	1323	880502	-31.42	-150.00	10.5	35.63	20.7	201.0	0.20		136.4	3.8
S81.	TQ-00443	1342	880912	-31.12	-150.00	9.5	35.68	17.8	173.0	-3.10		117.1	6.7
S81.	TQ-00450	1362	890203	-31.10	-150.00	9.4	35.37	23.6	176.0	1.10		110.9	3.9
S81.	TQ-00463	1403	891113	-30.00	-149.00	9.4	35.65	20.5	180.0	0.00		117.3	4.4
S81.	TQ-00493	1442	900813	-30.20	-150.00	10.0	35.54	19.0	199.0	0.10		134.4	4.7
S81.	TQ-00517	1481	910519	-30.50	-151.00	10.0	35.60	20.0	181.0	-0.10		117.7	3.7
S81.	TQ-00531#	1500	910928	-30.00	-161.50	10.9	35.43	17.6	174.0	-3.50		119.3	4.5
S81.	TQ-00544#	1521	920217	-32.12	-161.60	10.5	35.36	22.1	167.0	-1.90		108.4	3.9
S81.	TQ-00558#	1580	930406	-23.80	-149.00	10.0	35.84	27.0	166.0	-4.50	*	112.8	3.2
S81.	TQ-00567#	1599	930816	-26.70	-153.90	10.6	35.79	21.0	-999.9	-999.90		-999.9	-999.9
S81.	TQ-00576#	1618	940102	-24.00	-150.00	10.3	-999.90	26.5	170.0	-0.50		107.8	4.6
S81.	TQ-00594#	1638	940516	-25.57	-150.60	10.0	35.61	25.0	-999.9	-999.90		-999.9	-999.9

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 82 Pacific Ocean: 4 samples (1970-1972); 33°-36°S, 170°W</b>													
S82.	SV-00139	375	700306	-35.33	-170.00	2.5	35.48	26.0	159.0	2.70		93.6	8.0
S82.	SV-00150	394	700719	-34.00	-170.00	4.0	-999.90	21.0	148.0	1.30		85.6	8.0
S82.	SV-00194	465	711125	-33.15	-170.00	3.0	35.43	24.0	192.0	1.30		127.5	8.0
S82.	SV-00222	502	720810	-35.93	-170.00	4.0	35.02	17.0	199.0	5.00		125.3	8.0
<b>Station 83 Pacific Ocean: 17 samples (1976, 1986-1994); 33°-39°S, 157°-162°E</b>													
S83.	SV-00279	681	760115	-36.65	160.00	7.0	35.58	22.0	186.0	5.10		113.9	11.0
S83.	SV-00283	700	760526	-36.73	160.00	7.0	35.45	19.0	194.0	-6.20		145.9	10.0
S83.	TQ-00360#	1226	860628	-33.98	159.83	7.0	35.75	19.5	200.0	0.00		136.1	6.4
S83.	TQ-00385	1266	870401	-35.58	160.00	9.8	35.71	20.1	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00418	1304	871224	-36.62	160.00	9.5	35.52	19.5	175.0	0.60		111.2	3.2
S83.	TQ-00433	1324	880510	-36.67	160.00	10.0	35.82	19.6	181.0	-0.60		119.1	3.5
S83.	TQ-00445	1343	880921	-36.63	160.00	9.5	35.64	16.0	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00452	1363	890212	-36.63	159.87	9.9	35.69	20.5	168.0	1.50		102.2	3.9
S83.	TQ-00465	1404	891122	-36.67	160.00	9.2	35.53	18.3	167.0	1.20		102.3	4.1
S83.	TQ-00495	1443	900826	-36.97	160.00	9.9	35.41	14.1	162.0	1.10		97.2	4.6
S83.	TQ-00519	1483	910527	-38.50	160.00	9.9	35.54	20.8	184.0	0.60		119.7	3.8
S83.	TQ-00533	1501	911004	-37.00	157.50	10.8	35.26	16.0	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00546	1522	920224	-36.98	157.98	10.3	35.38	20.8	178.0	0.80		112.6	3.8
S83.	TQ-00559	1581	930413	-36.12	160.25	10.0	35.72	21.7	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00569	1600	930824	-36.33	161.80	9.9	35.52	15.5	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00578	1620	940110	-36.67	158.00	10.3	35.68	19.3	-999.9	-999.90		-999.9	-999.9
S83.	TQ-00586	1639	940524	-36.38	161.35	10.0	35.67	18.5	164.0	-1.70		104.5	3.9
<b>Station 84 Pacific Ocean: 21 samples (1971-1976, 1987-1994); 30°-39°S, 178°W-178°E</b>													
S84.	SV-00188	449	710808	-34.98	179.53	5.5	-999.90	15.0	200.0	1.50		134.5	8.0
S84.	SV-00233	537	730415	-35.73	180.00	7.0	35.53	19.0	191.0	19.00		88.2	13.0
S84.	SV-00249	575	740101	-35.87	180.00	7.0	35.67	20.0	173.0	1.20		110.1	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
S84.	SV-00261	597	740605	-35.27	180.00	7.0	35.50	18.0	-999.9	-999.90		-999.9	-999.9
S84.	SV-00265	617	741024	-35.70	180.00	7.0	35.46	17.0	202.0	17.80		100.1	10.0
S84.	SV-00269	646	750516	-36.67	180.00	7.0	35.39	21.0	216.0	27.10		93.0	14.0
S84.	SV-00277	660	750824	-35.85	180.00	7.0	-999.90	16.0	148.0	3.20		81.0	7.0
S84.	SV-00284	702	760613	-38.37	178.57	7.0	35.46	17.0	176.0	-3.80		123.9	10.0
S84.	TQ-00384	1265	870327	-35.52	-179.80	10.4	35.65	20.1	-999.9	-999.90		-999.9	-999.9
S84.	TQ-00417	1303	871218	-36.33	-180.00	9.5	35.45	20.0	161.0	-0.20		99.2	3.6
S84.	TQ-00432	1323	880506	-35.83	-180.00	10.5	35.52	13.3	161.0	-0.60		100.4	3.8
S84.	TQ-00444	1342	880917	-35.78	-180.00	9.5	35.65	16.1	-999.9	-999.90		-999.9	-999.9
S84.	TQ-00451	1363	890208	-36.17	-180.00	9.4	35.66	22.0	176.0	1.70		109.0	3.8
S84.	TQ-00464	1403	891118	-35.67	180.00	9.3	35.61	18.8	168.0	-0.10		105.8	4.4
S84.	TQ-00494	1442	900818	-36.15	180.00	10.0	35.48	16.0	158.0	0.80		94.4	4.6
S84.	TQ-00518#	1482	910523	-30.33	-180.00	10.1	35.53	18.0	167.0	-0.30		105.0	3.9
S84.	TQ-00532	1501	911001	-33.50	-180.00	10.9	35.30	15.5	-999.9	-999.90		-999.9	-999.9
S84.	TQ-00545	1521	920220	-35.78	179.03	10.3	35.24	21.4	189.0	0.00		125.2	4.0
S84.	TQ-00568	1599	930820	-34.55	-178.70	10.6	35.50	15.0	162.0	-4.90	*	110.3	4.6
S84.	TQ-00577	1619	940107	-32.00	-179.00	10.3	-999.90	22.9	-999.9	-999.90		-999.9	-999.9
S84.	TQ-00585	1638	940521	-34.83	-179.60	10.0	35.59	17.6	-999.9	-999.90		-999.9	-999.9
<b>Station 85 Pacific Ocean: 1 sample (1975); 41°27'S, 150°00'E</b>													
S85.	SV-00278	666	751005	-41.45	150.00	7.0	35.53	14.0	149.0	3.70		81.0	9.0
<b>Station 86 Pacific Ocean: 2 samples (1976-1977); 39°-41°S, 150°-154°W</b>													
S86.	SV-00281	687	760227	-39.68	-150.00	7.0	35.41	20.0	215.0	1.10		149.9	8.0
S86.	TO-00011	753	770605	-40.78	-154.00	7.5	34.55	15.7	192.0	-2.90		136.7	7.0
<b>Station 87 Pacific Ocean: 3 samples (1973, 1976); 39°-43°S, 174°-180°E</b>													
S87.	SV-00234	543	730524	-42.83	174.42	6.0	34.69	12.0	157.0	9.50		77.2	8.0
S87.	SV-00242	563	731013	-41.60	179.28	7.0	34.26	15.0	-999.9	-999.90		-999.9	-999.9
S87.	SV-00280	687	760225	-39.98	180.00	7.0	35.37	19.0	162.0	4.90		88.9	10.0

Station	LABREF	Week (exposure)	SAMDAT	Lat (location) (decimal degrees)	Long	Depth (m)	Salin (pss)	Temp (°C)	DC14 (‰)	DC13 (‰)	Flag 13 (*)	CRC14 (‰)	SIGMA
<b>Station 88 Pacific Ocean: 5 samples (1973-1975); 46°-47°S, 168°-172°E</b>													
S88.	SV-00241	560	730923	-46.65	169.45	7.0	-999.90	10.0	150.0	-0.40		91.2	10.0
S88.	SV-00250	579	740202	-46.67	169.50	7.0	34.10	14.0	161.0	2.20		96.1	8.0
S88.	SV-00262	605	740801	-46.38	171.42	7.0	34.25	8.0	150.0	11.10		66.1	10.0
S88.	SV-00266	624	741214	-46.68	169.67	7.0	34.82	12.0	150.0	3.20		83.1	9.0
S88.	SV-00270	642	750418	-46.72	168.95	7.0	34.01	14.0	149.0	9.10		69.0	8.0



## 15. VERIFICATION OF DATA TRANSPORT

The data file contained in this NDP may be read with the FORTRAN 77 or SAS® data retrieval programs provided. To verify that the data have been correctly transported to their systems, users should generate some or all of the statistics presented in Table 8. The table presents simple summary statistics for the file that contains data from all sites (i.e., file **nydala.asc**). If the statistics generated by the user differ from those presented here, the data file may have been corrupted in transport.

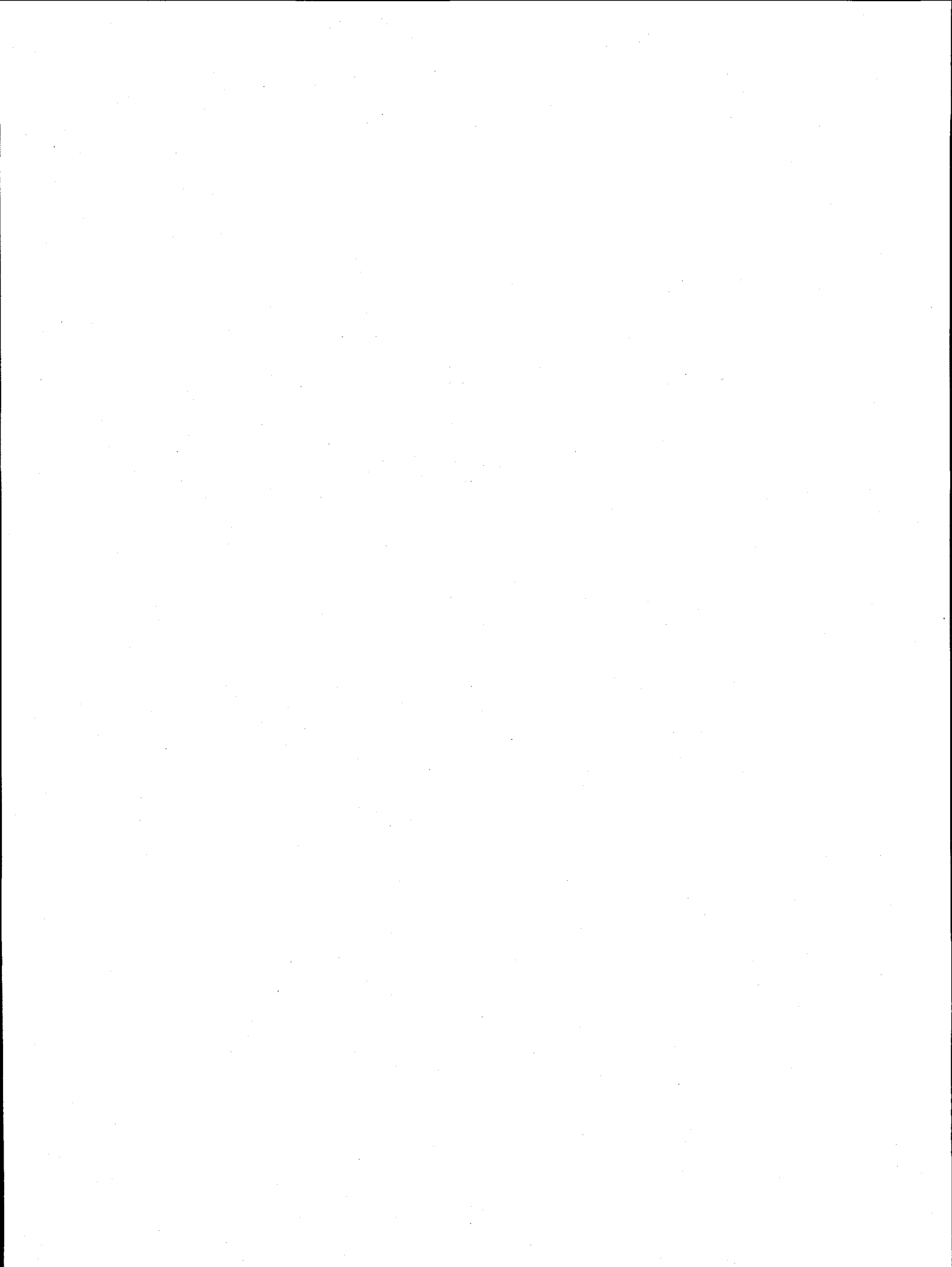
These statistics are presented only as a tool to ensure proper reading of the data file. They are not to be construed as summaries of the data set.

**Table 8. Characteristics of numeric variables in the file containing data from all sampling locations.**

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>
WEEK	950	925.6884211	414.0957518	151.0000000	1645.00
SAMDAT	950	803100.35	79497.60	651115.00	940707.00
LAT	950	7.1674316	32.2980072	-74.6500000	80.5200000
LONG	950	-8.2852737	90.2693177	-180.0000000	180.0000000
DEPTH	934	8.7553533	2.2289886	2.5000000	50.0000000
SALIN	781	35.3088220	1.1765270	29.5500000	38.9900000
TEMP	922	20.1385033	5.6245567	-1.2000000	30.5000000
DC14	862	160.6764501	50.1399432	-61.0000000	352.0000000
DC13	871	-0.8880023	4.2770528	-10.8000000	27.1000000
CRC14	871	101.2958668	45.079831	-113.3000000	280.9000000
SIGMA	871	6.8755454	2.4938658	3.0000000	15.0000000

## APPENDIX A

### <sup>14</sup>C MEASUREMENTS IN OCEAN SURFACE WATER CO<sub>2</sub> FOR DIFFERENT SAMPLING LOCATIONS



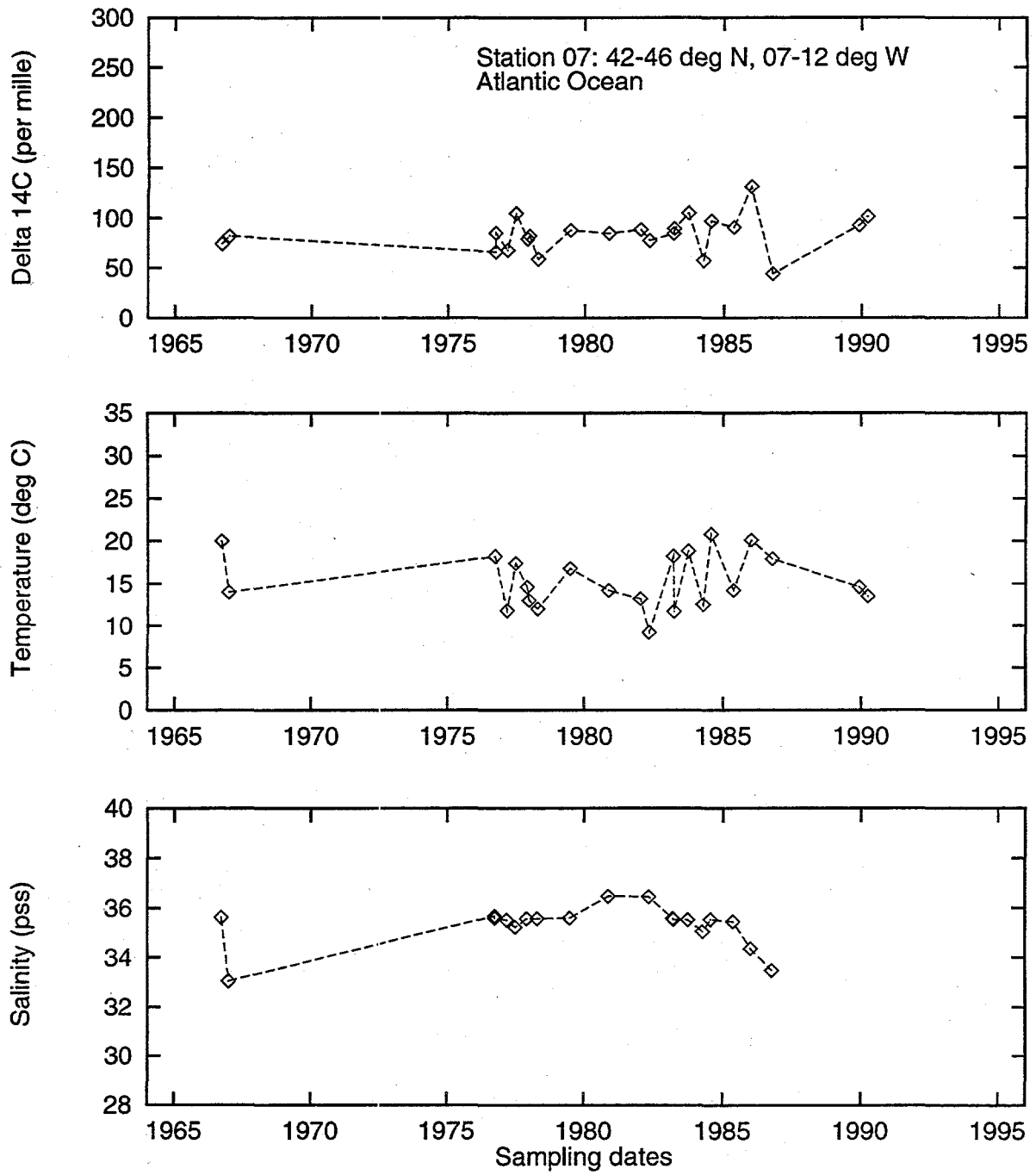


Figure A.1. Atlantic Ocean Station 7 corrected <sup>14</sup>C measurements, temperature data, and salinity data over time.

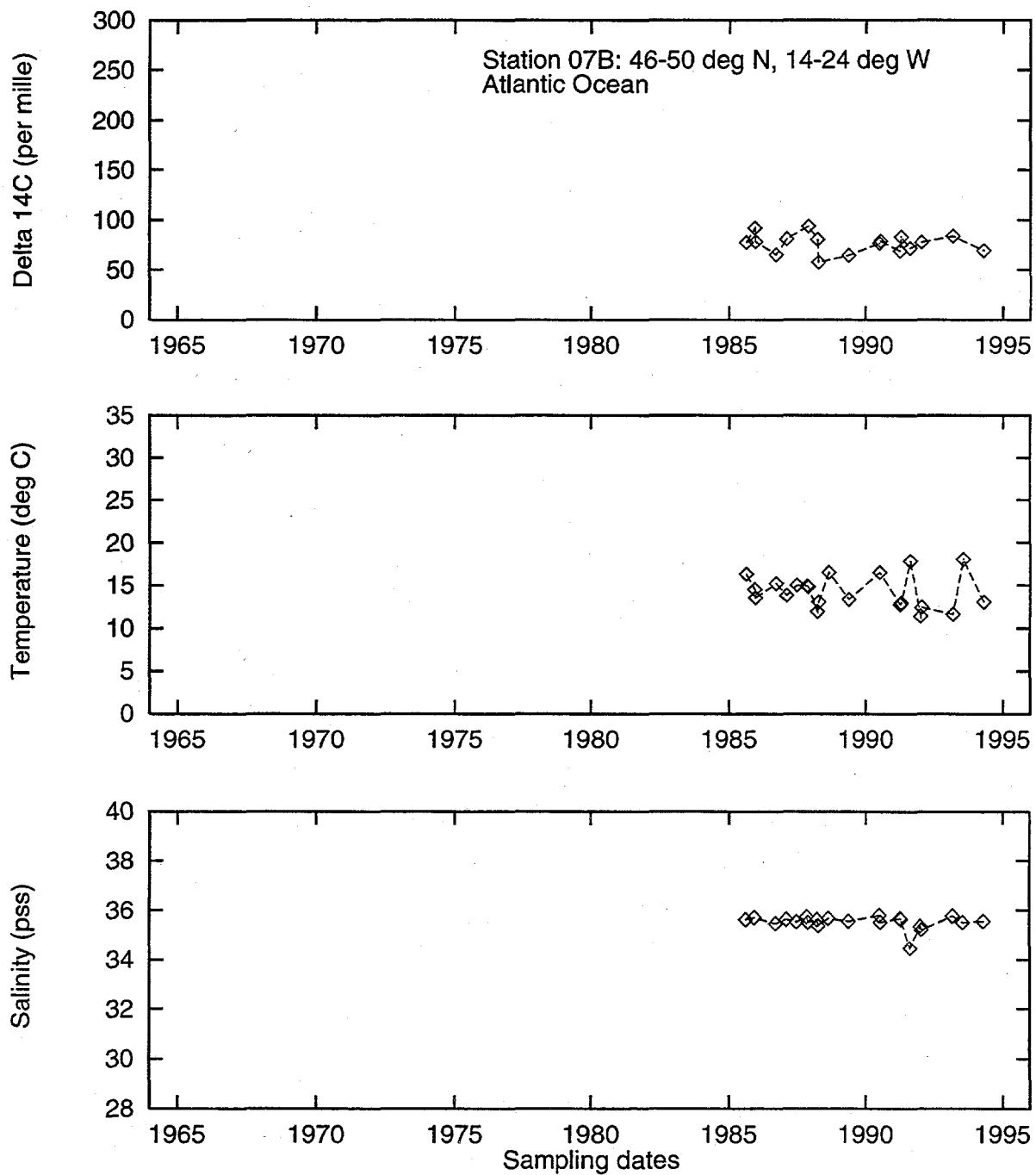


Figure A.2. Atlantic Ocean Station 7B corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

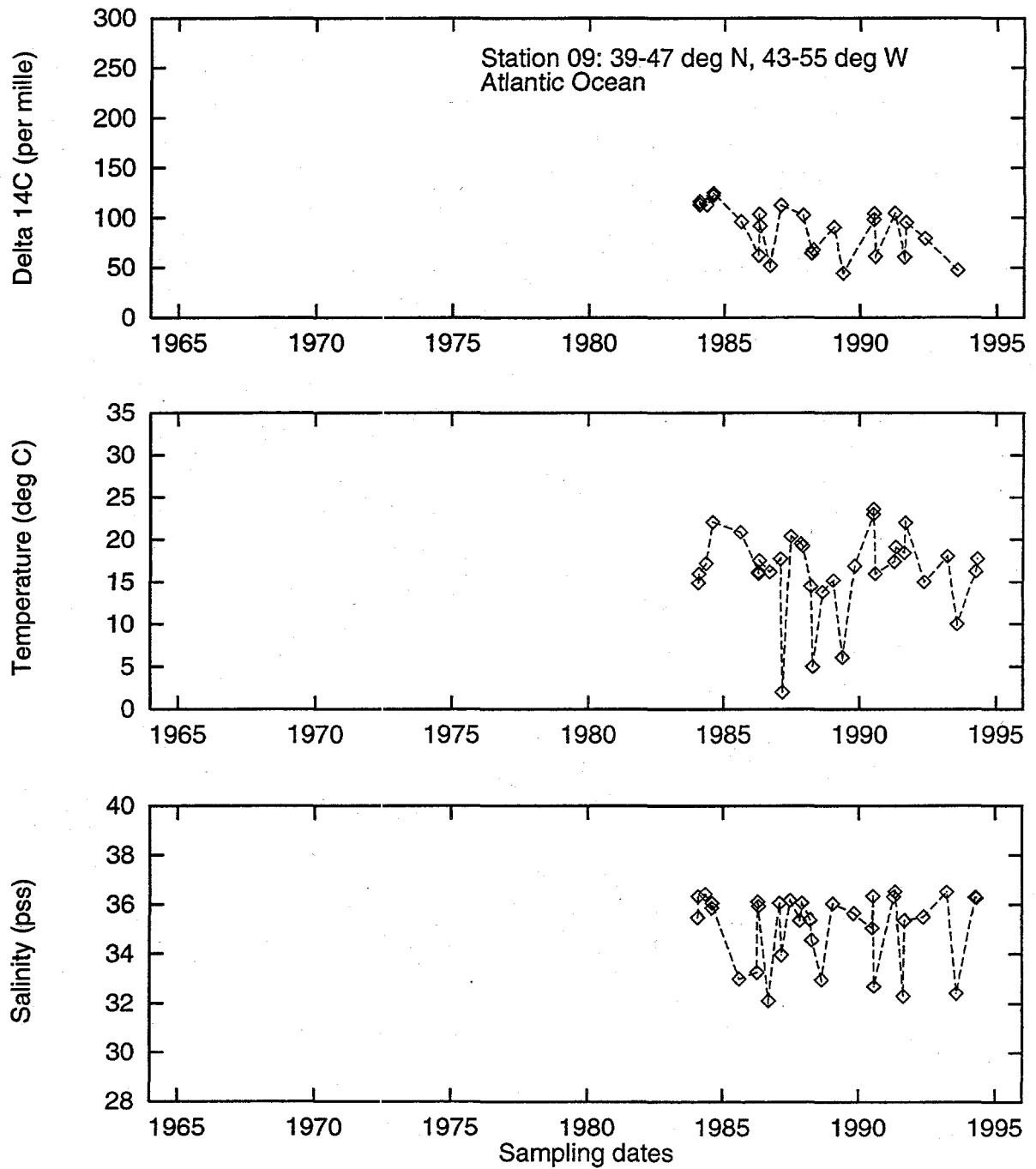


Figure A.3. Atlantic Ocean Station 9 corrected <sup>14</sup>C measurements, temperature data, and salinity data over time.

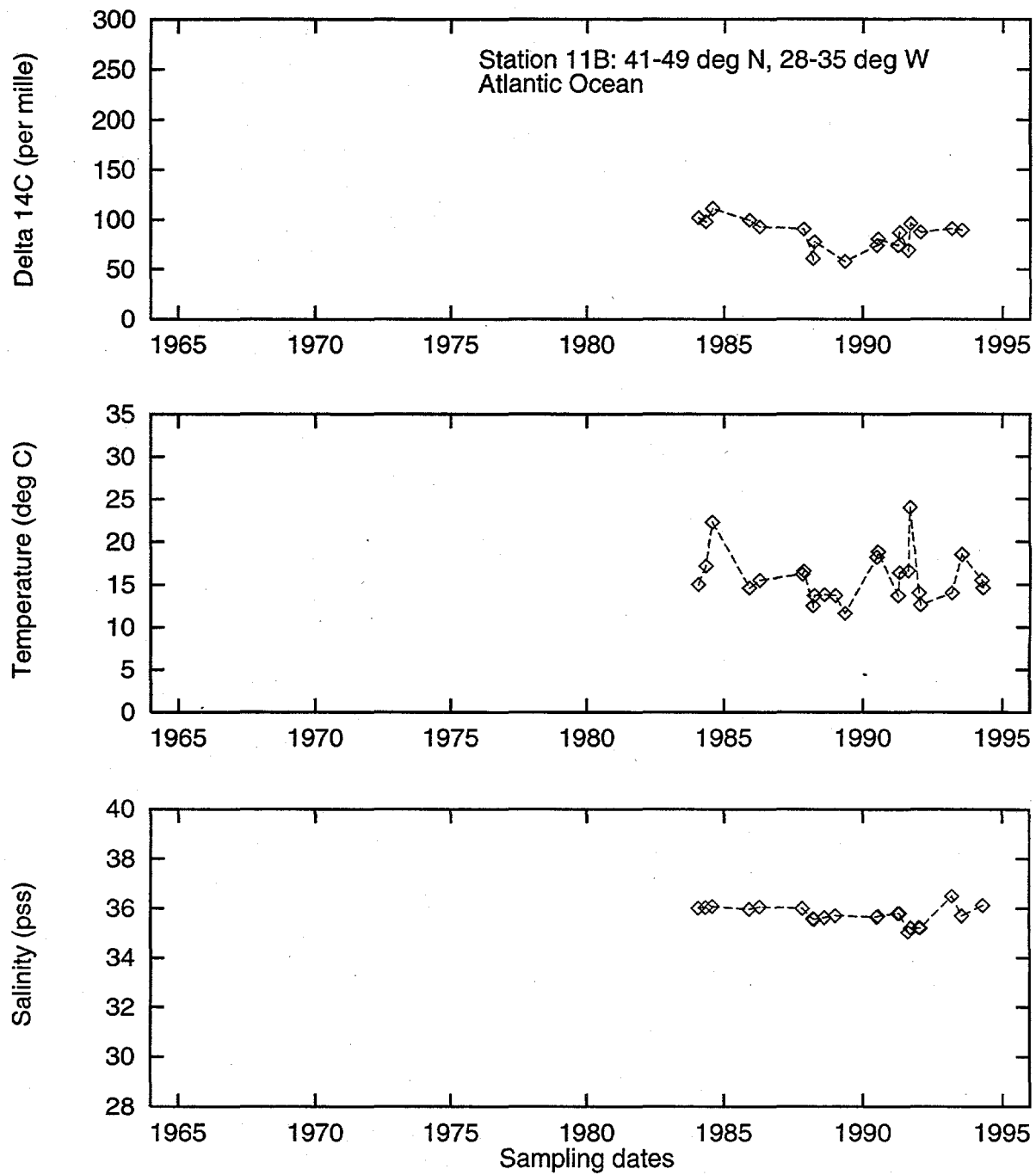


Figure A.4. Atlantic Ocean Station 11B corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

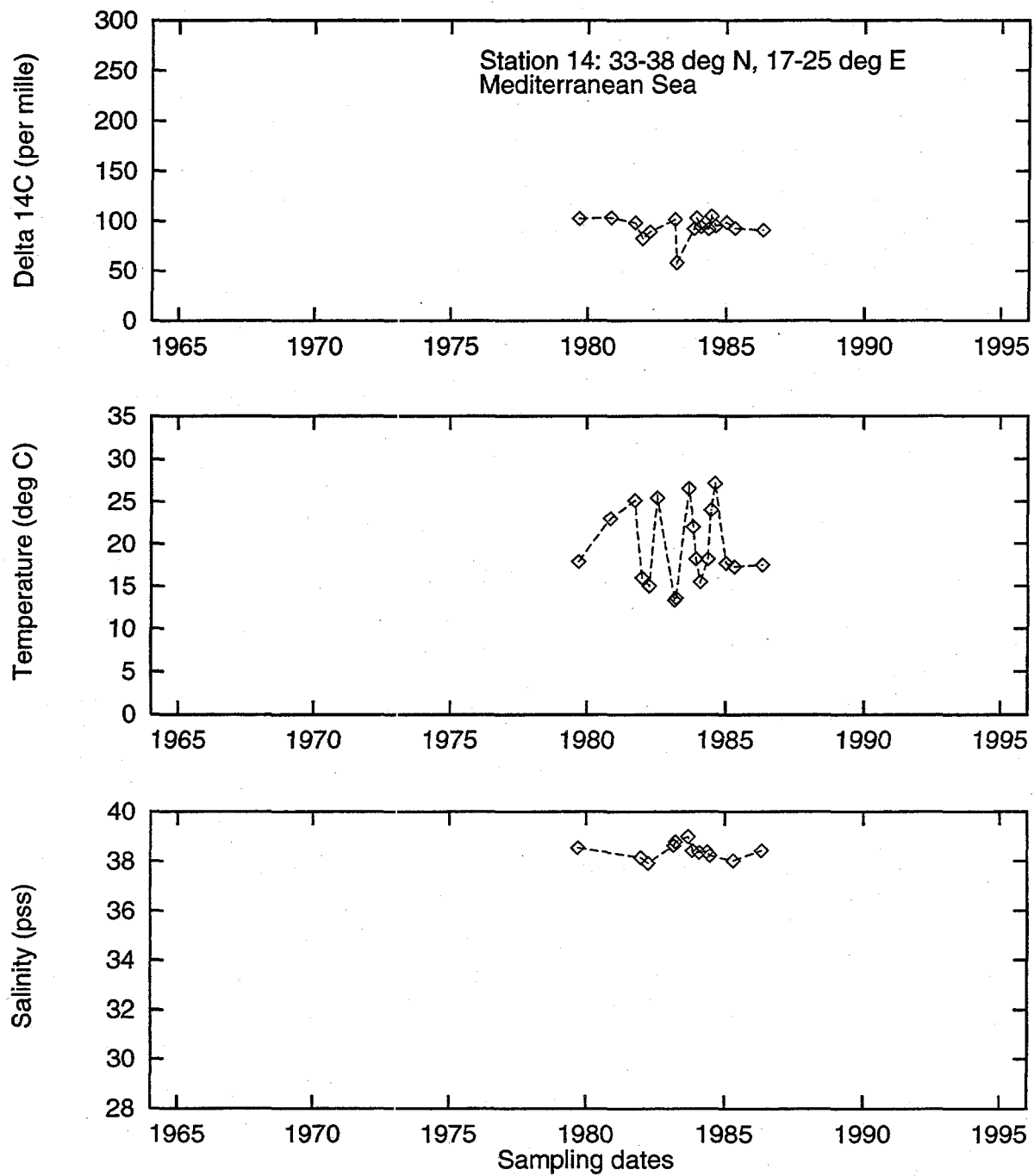


Figure A.5. Mediterranean Ocean Station 14 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.



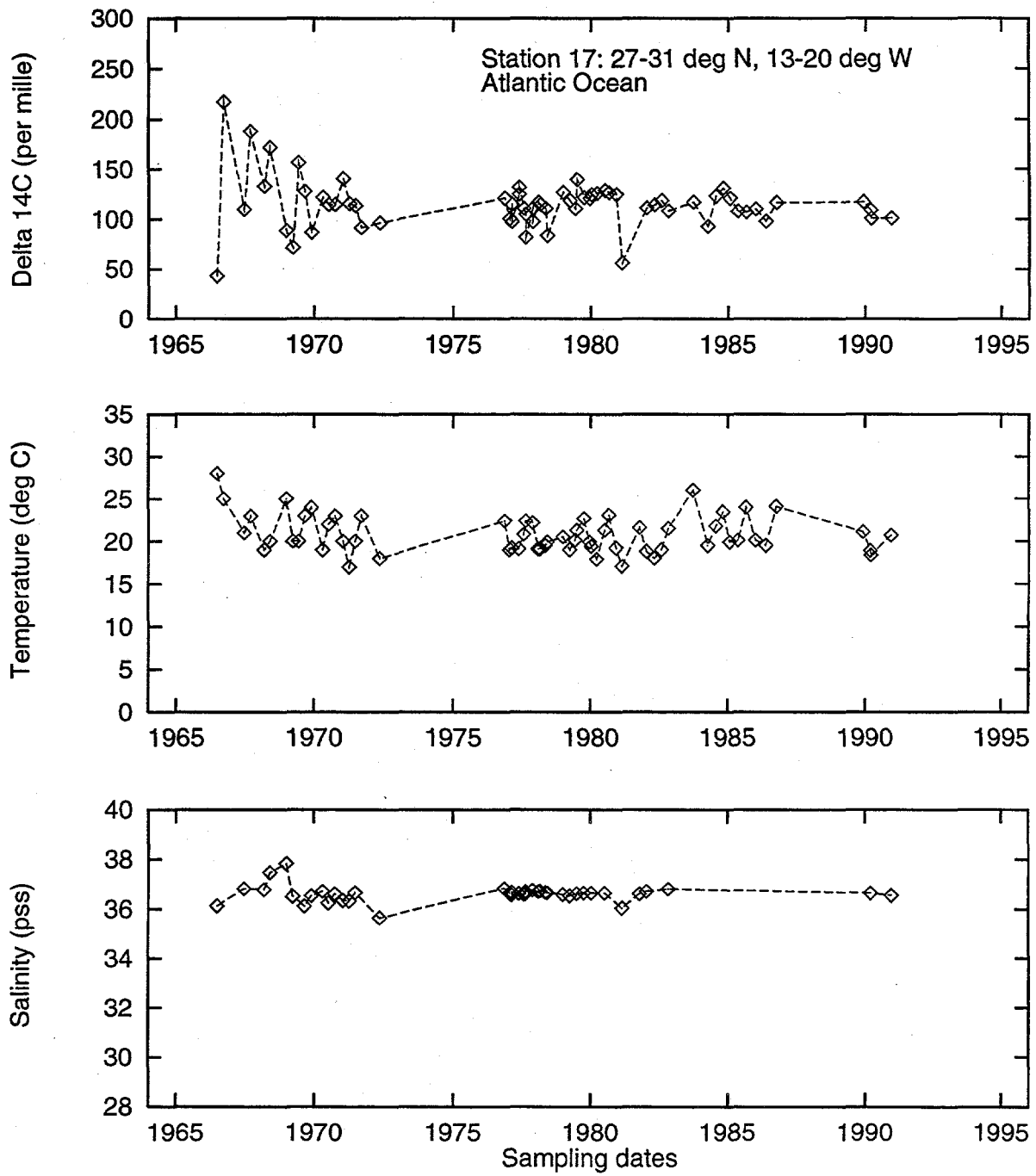


Figure A.6. Atlantic Ocean Station 17 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

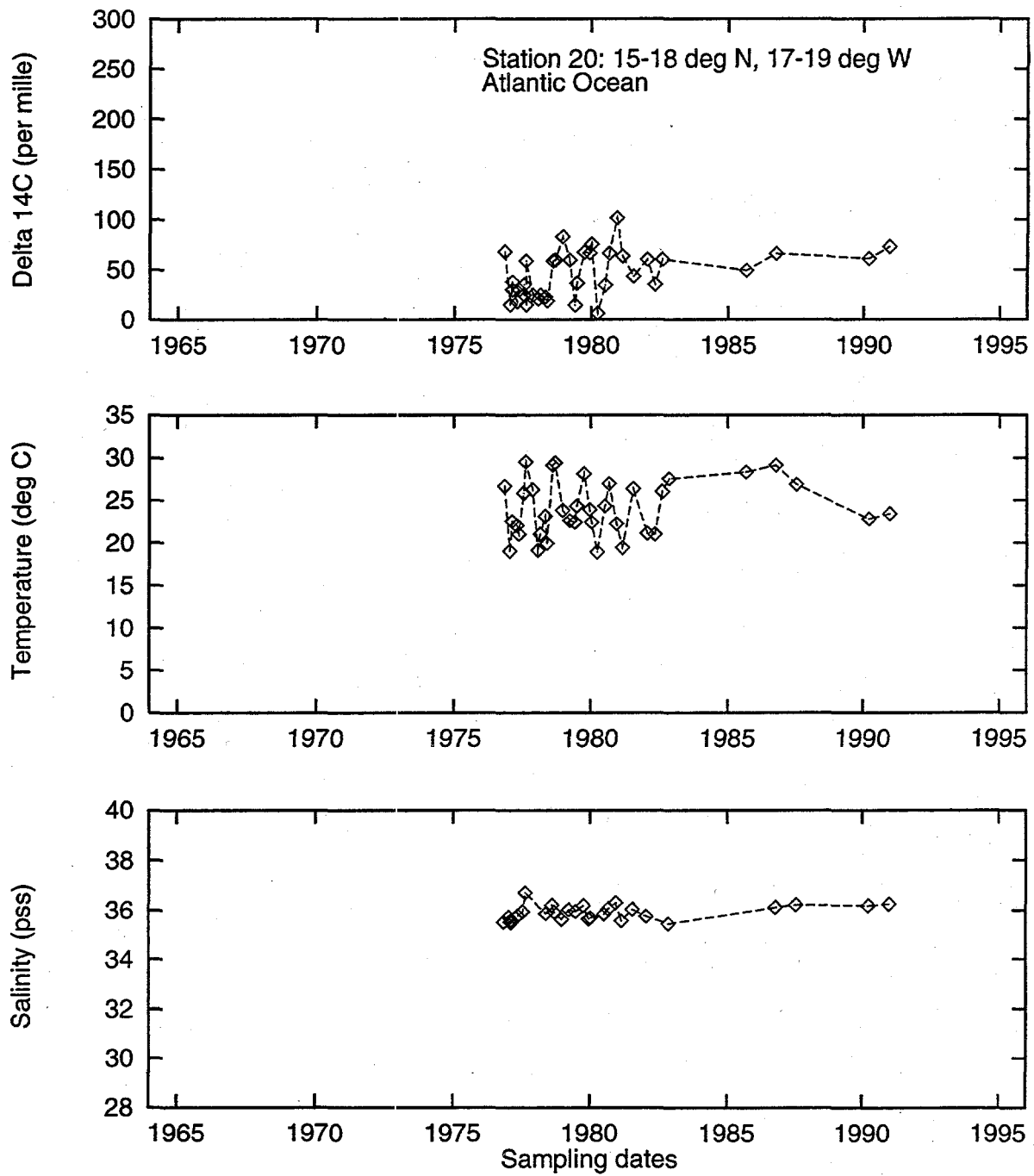


Figure A.7. Atlantic Ocean Station 20 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

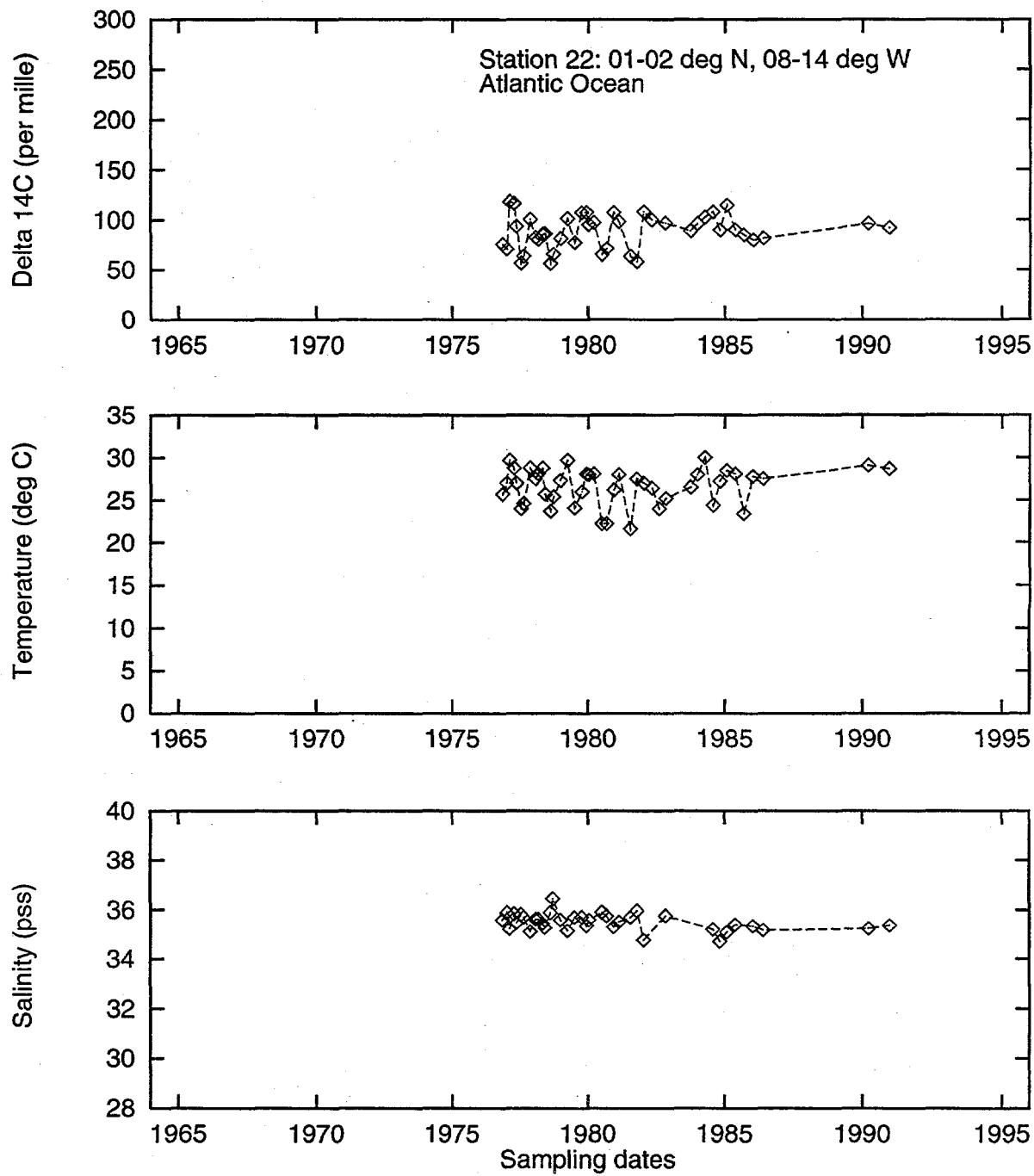


Figure A.8. Atlantic Ocean Station 22 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

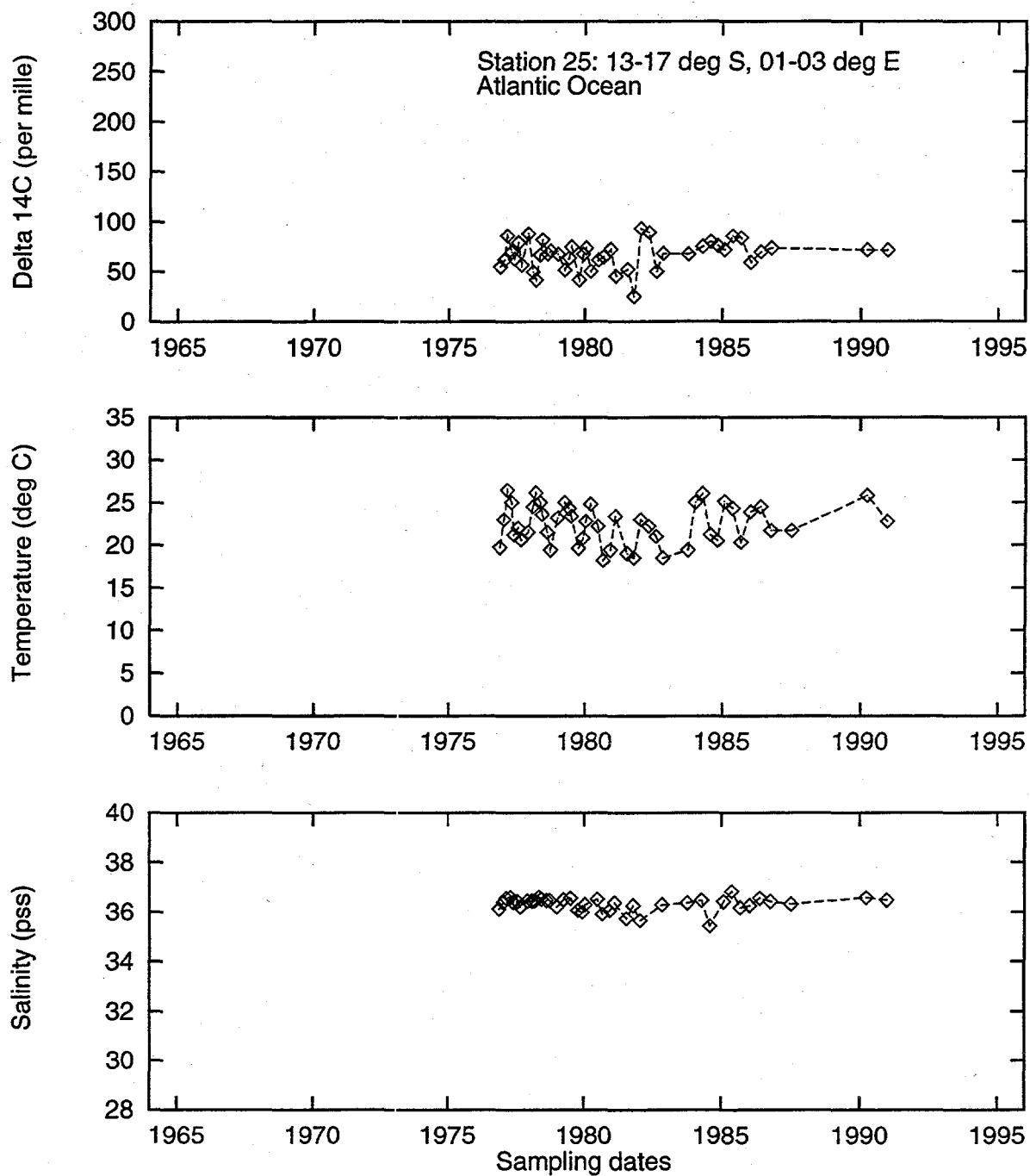


Figure A.9. Atlantic Ocean Station 25 corrected <sup>14</sup>C measurements, temperature data, and salinity data over time.

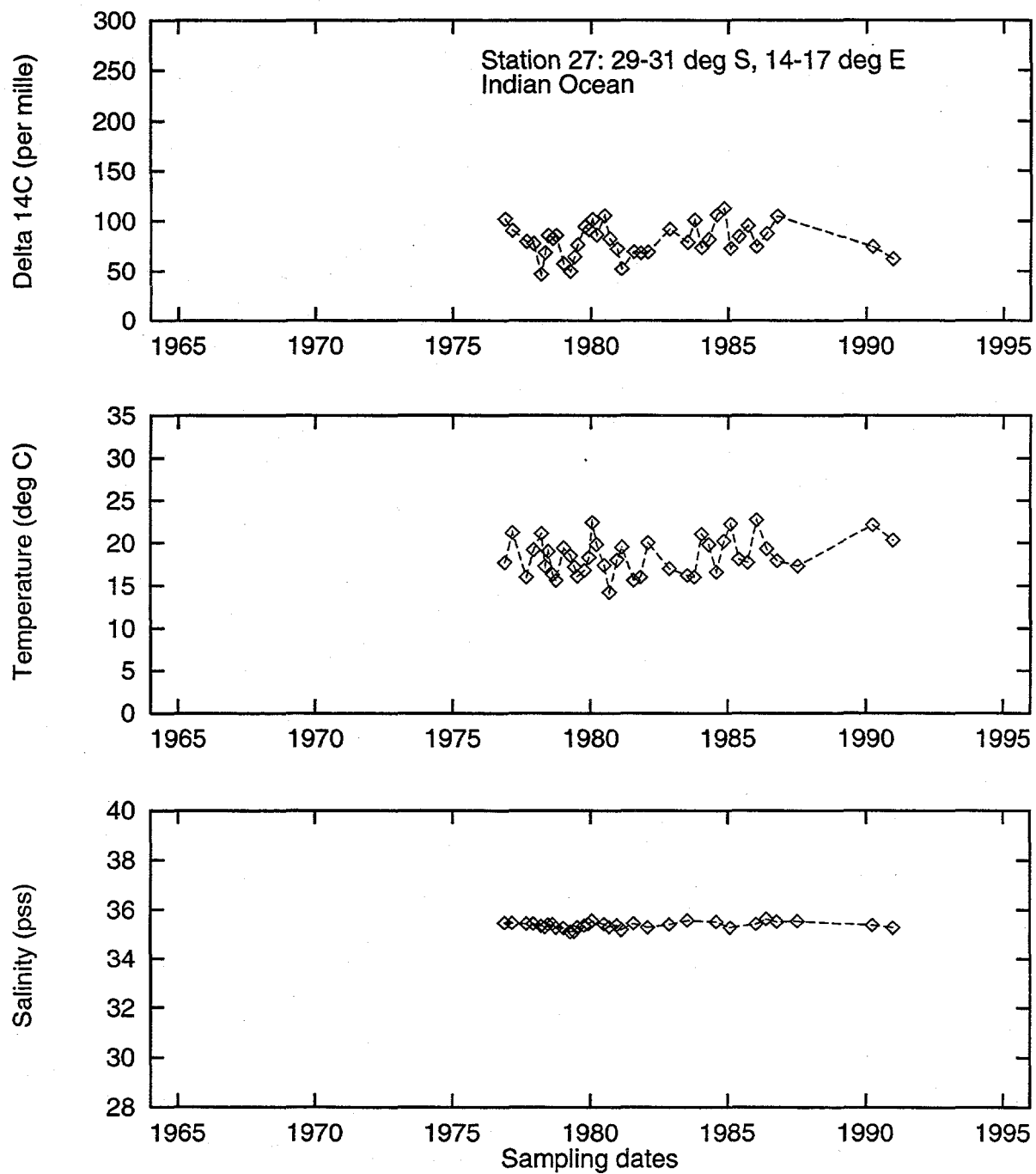


Figure A.10. Atlantic Ocean Station 27 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

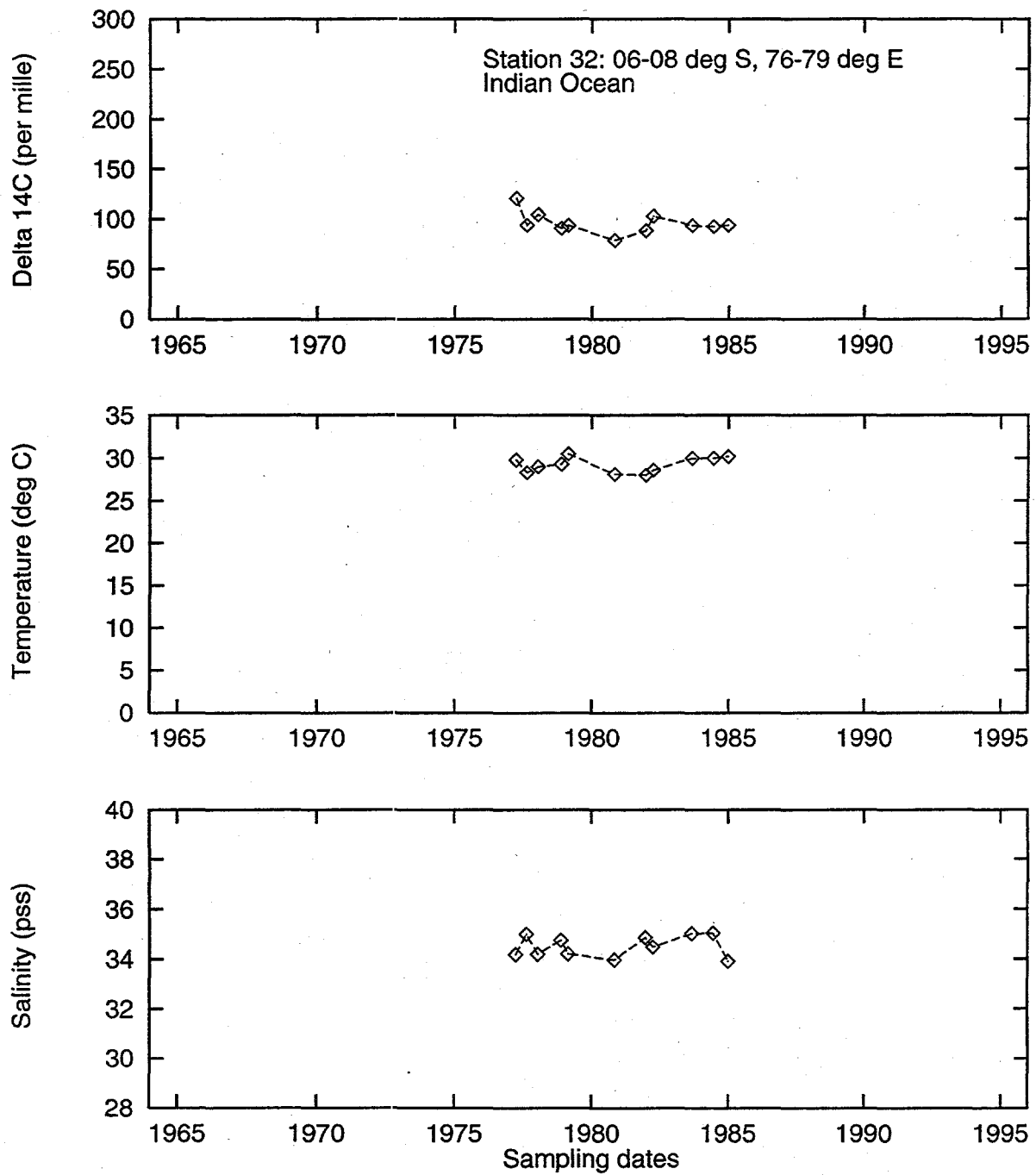


Figure A.11. Indian Ocean Station 32 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

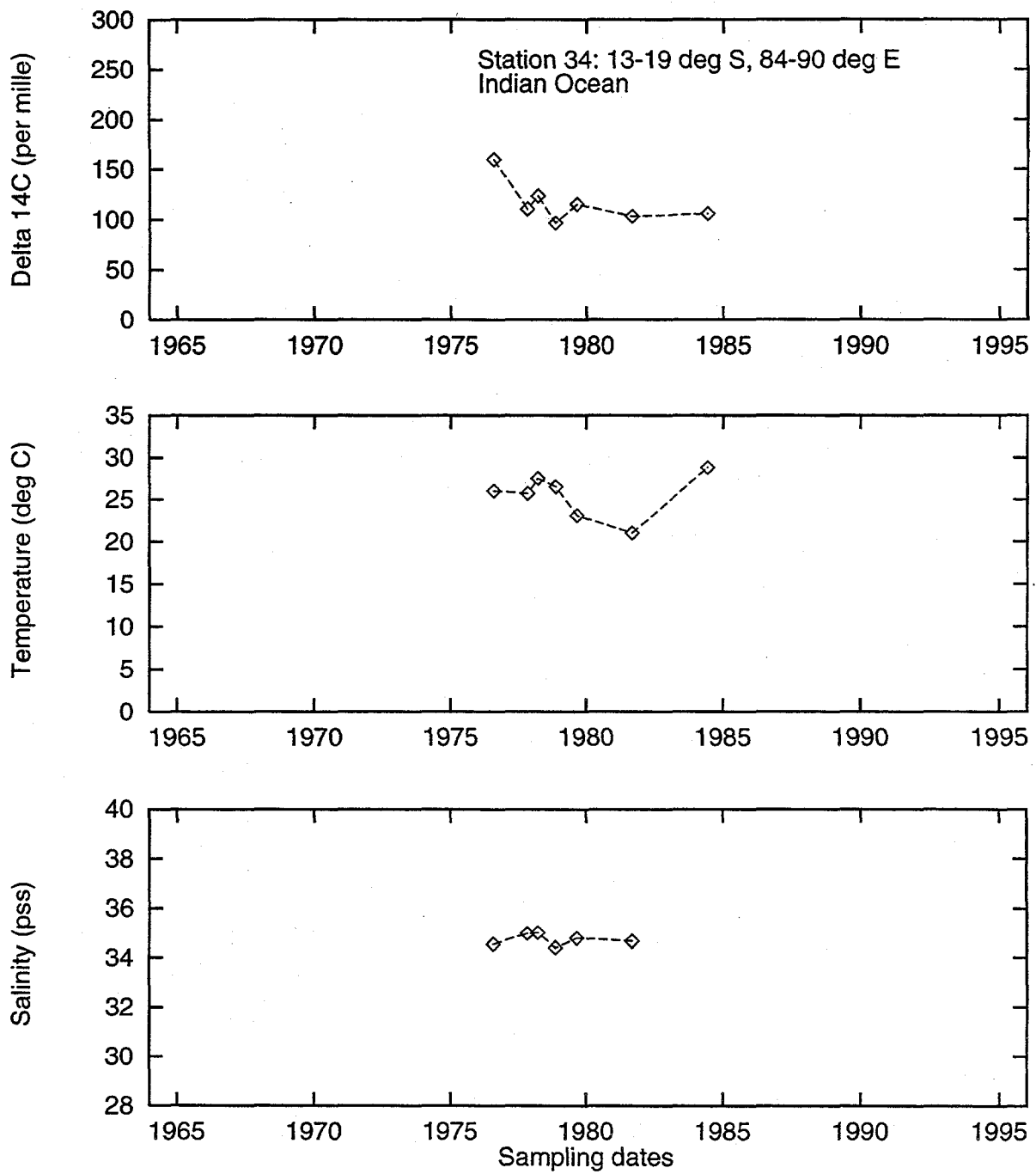


Figure A.12. Indian Ocean Station 34 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

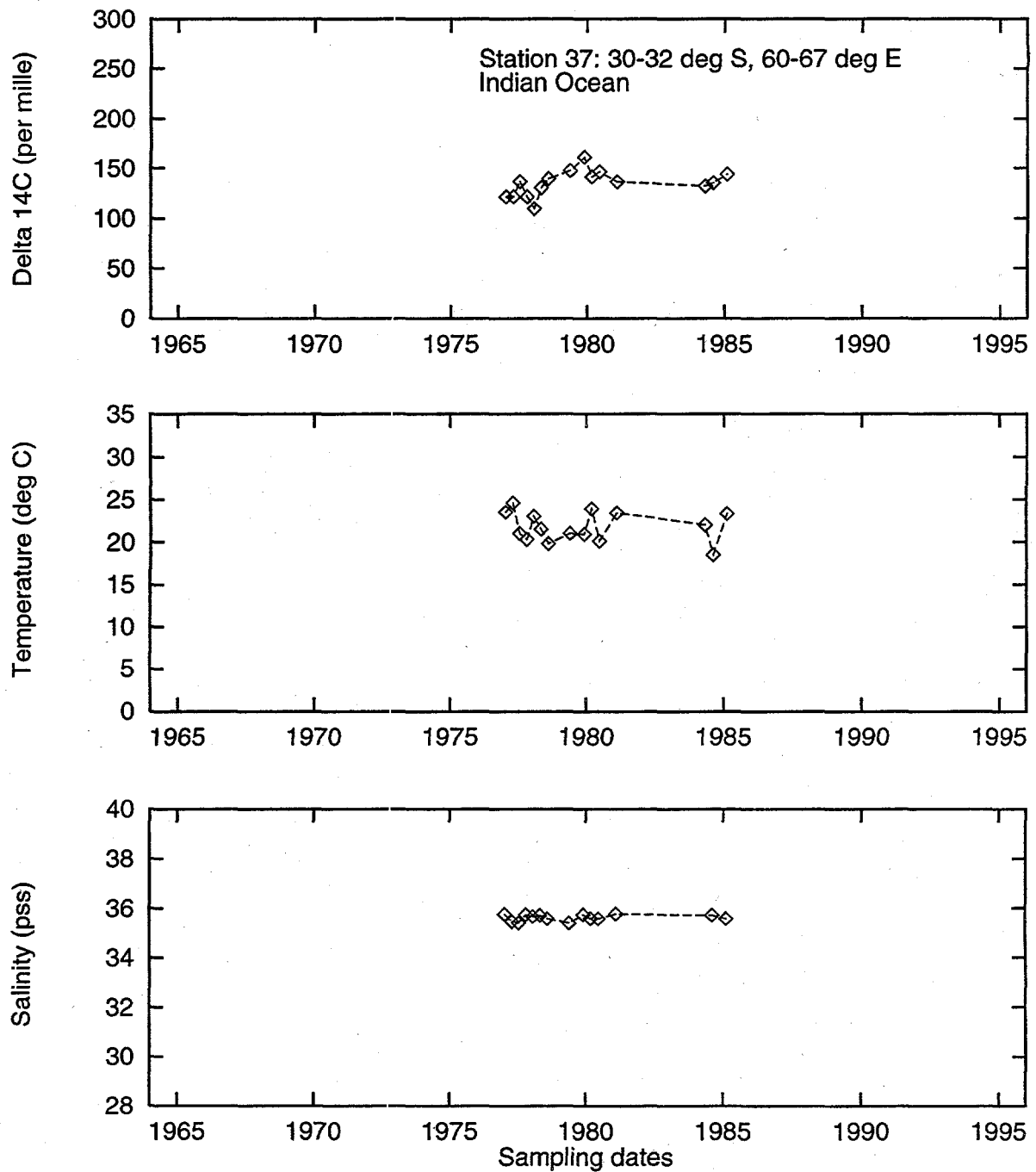


Figure A.13. Indian Ocean Station 37 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.



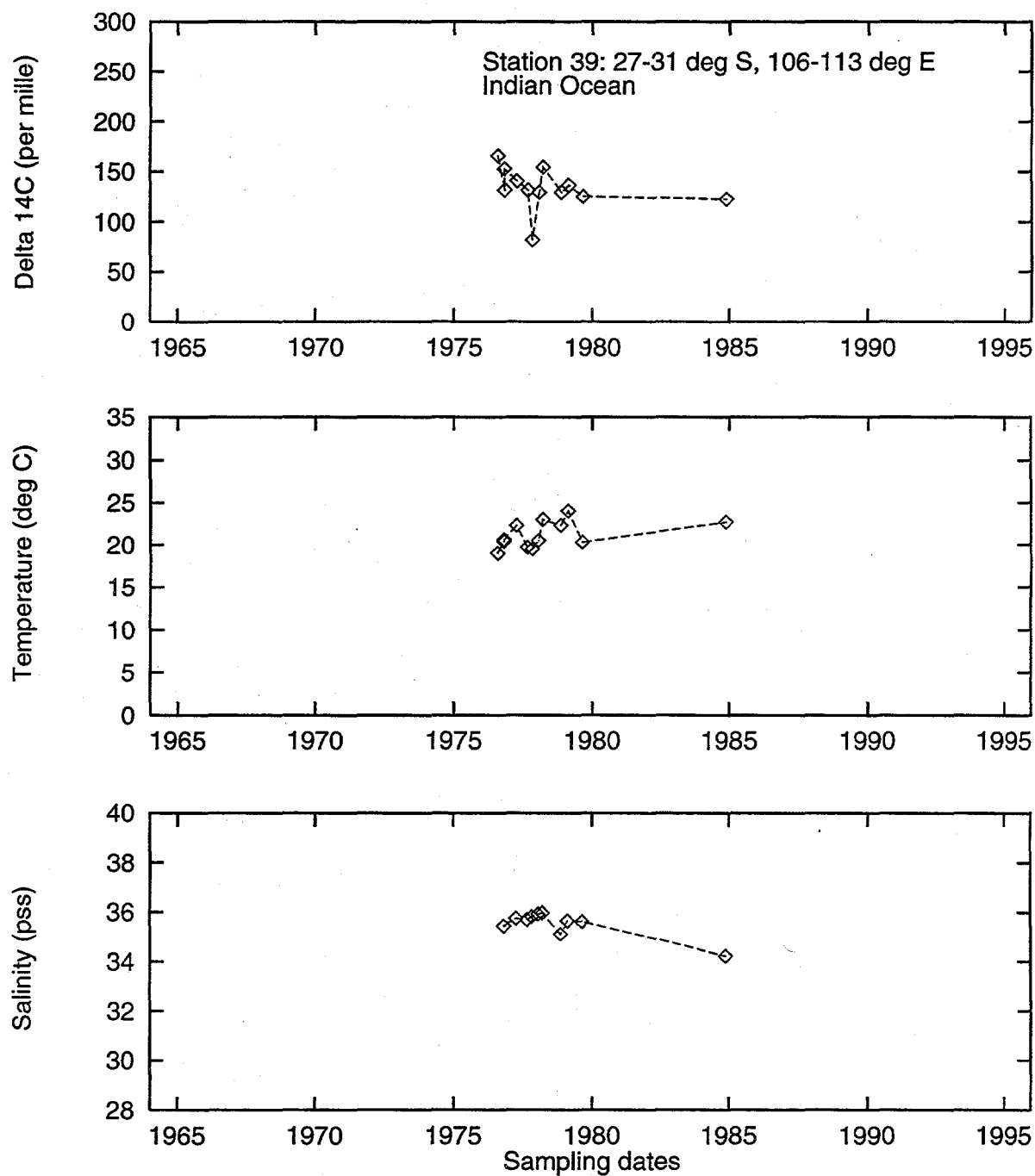


Figure A.14. Indian Ocean Station 39 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

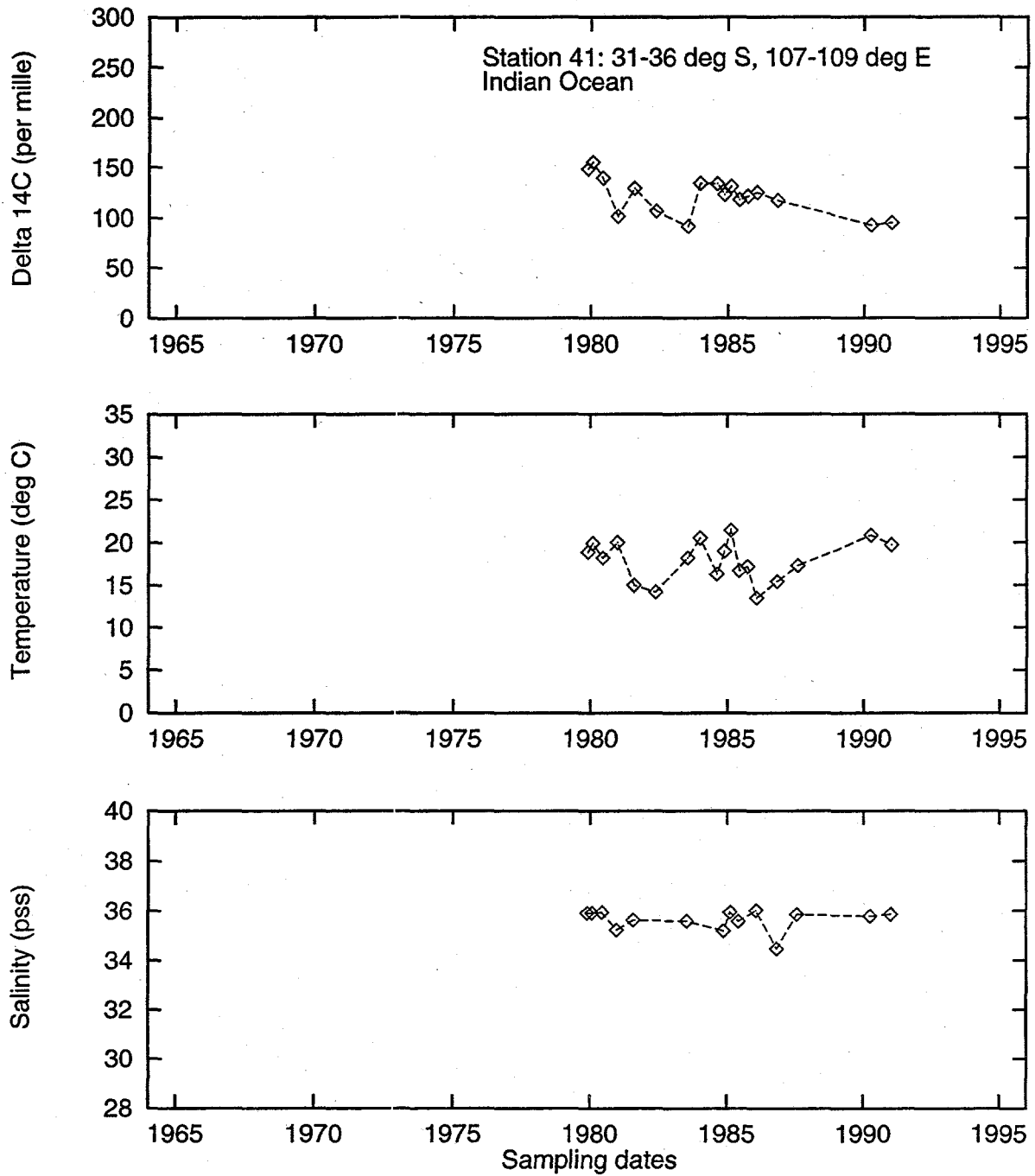


Figure A.15. Indian Ocean Station 41 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

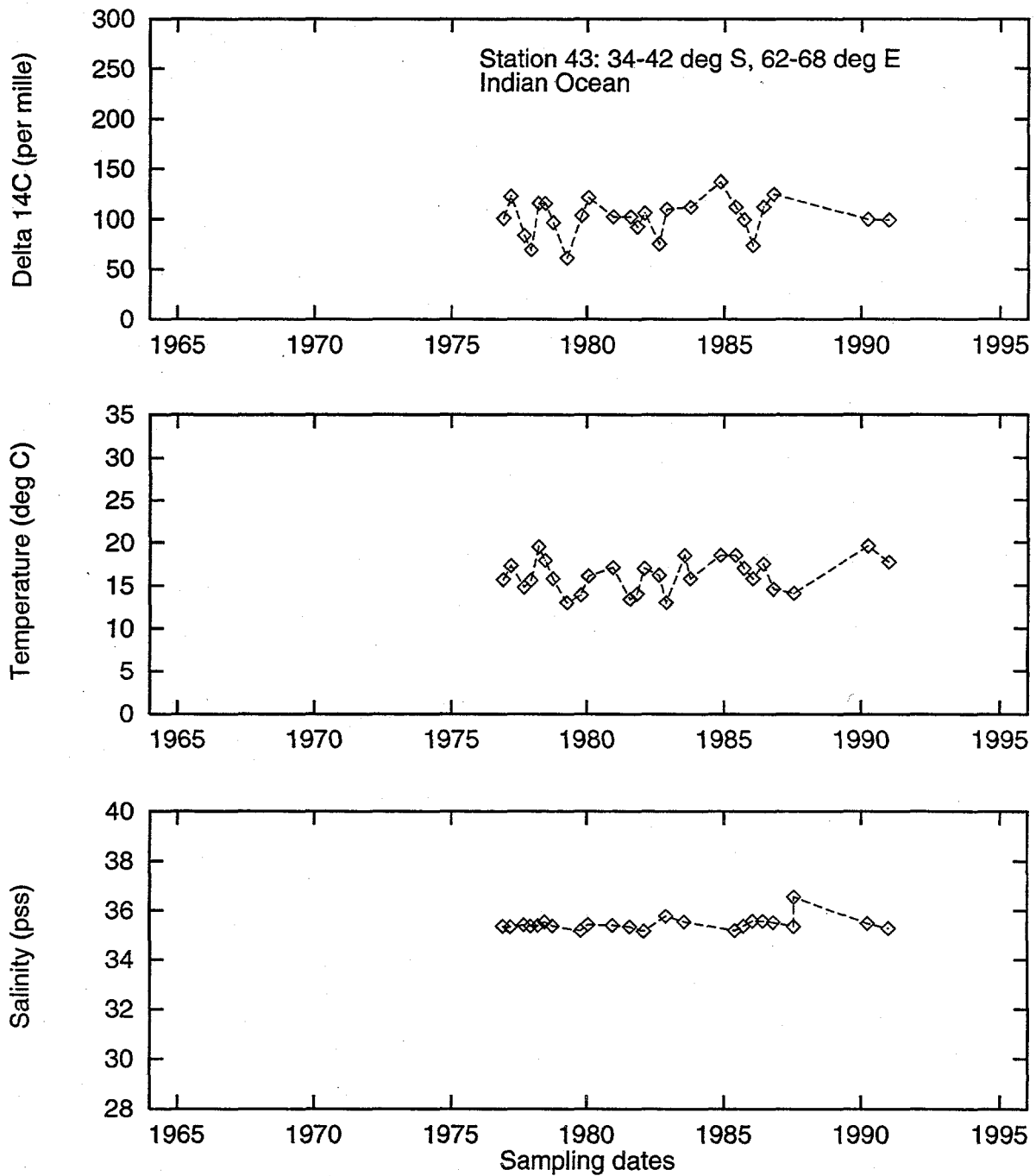


Figure A.16. Indian Ocean Station 43 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

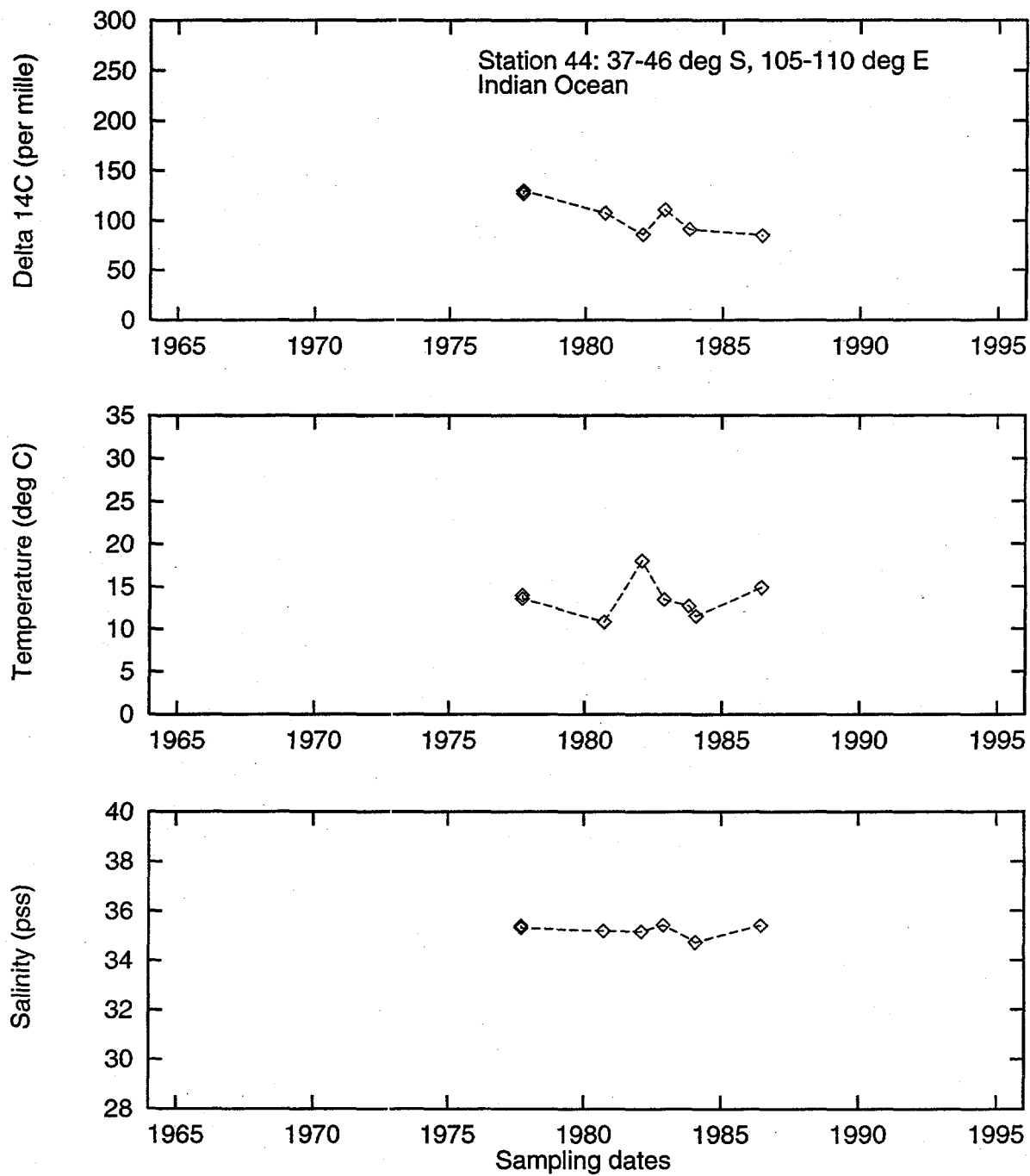


Figure A.17. Indian Ocean Station 44 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

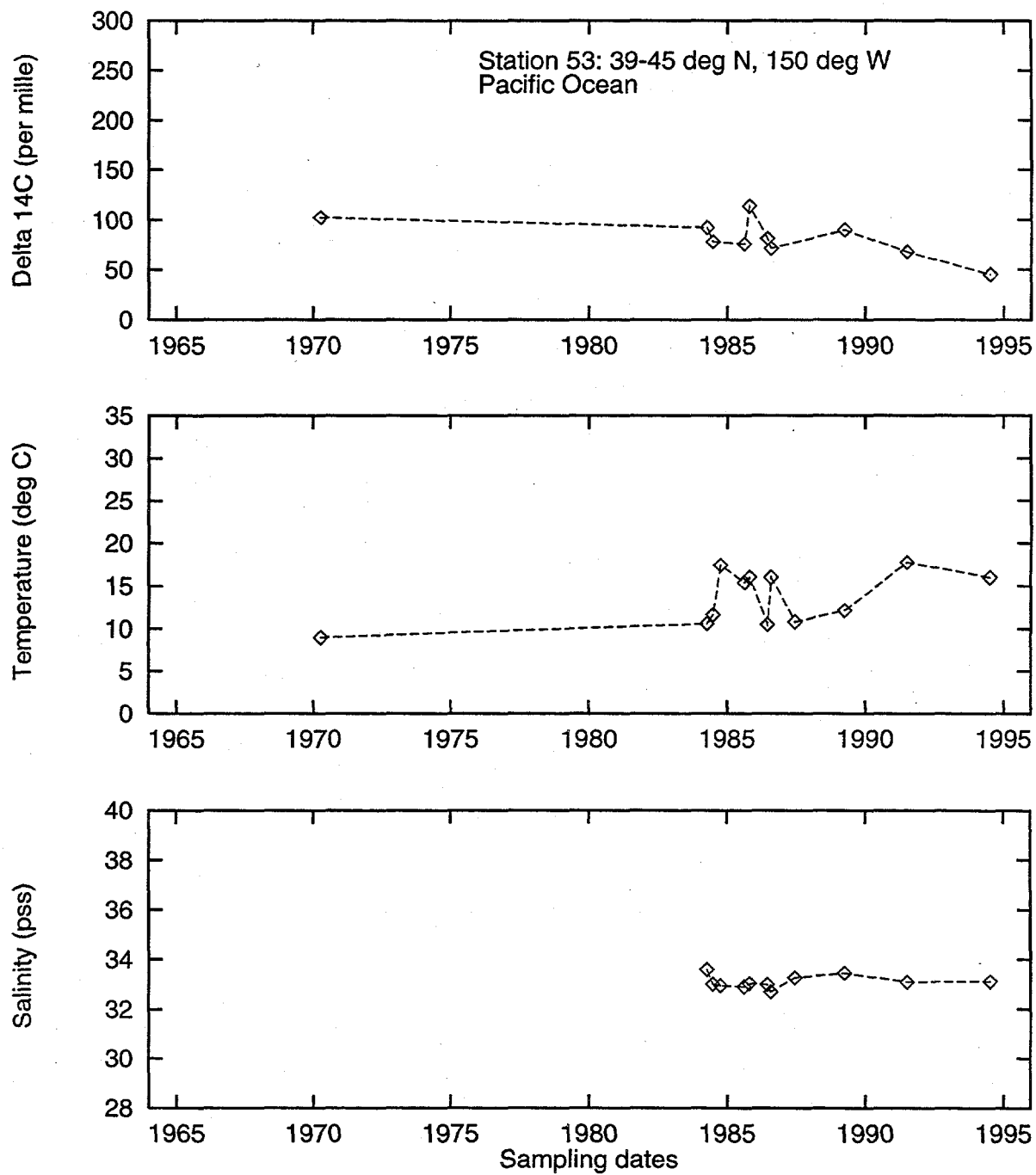


Figure A.18. Pacific Ocean Station 53 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

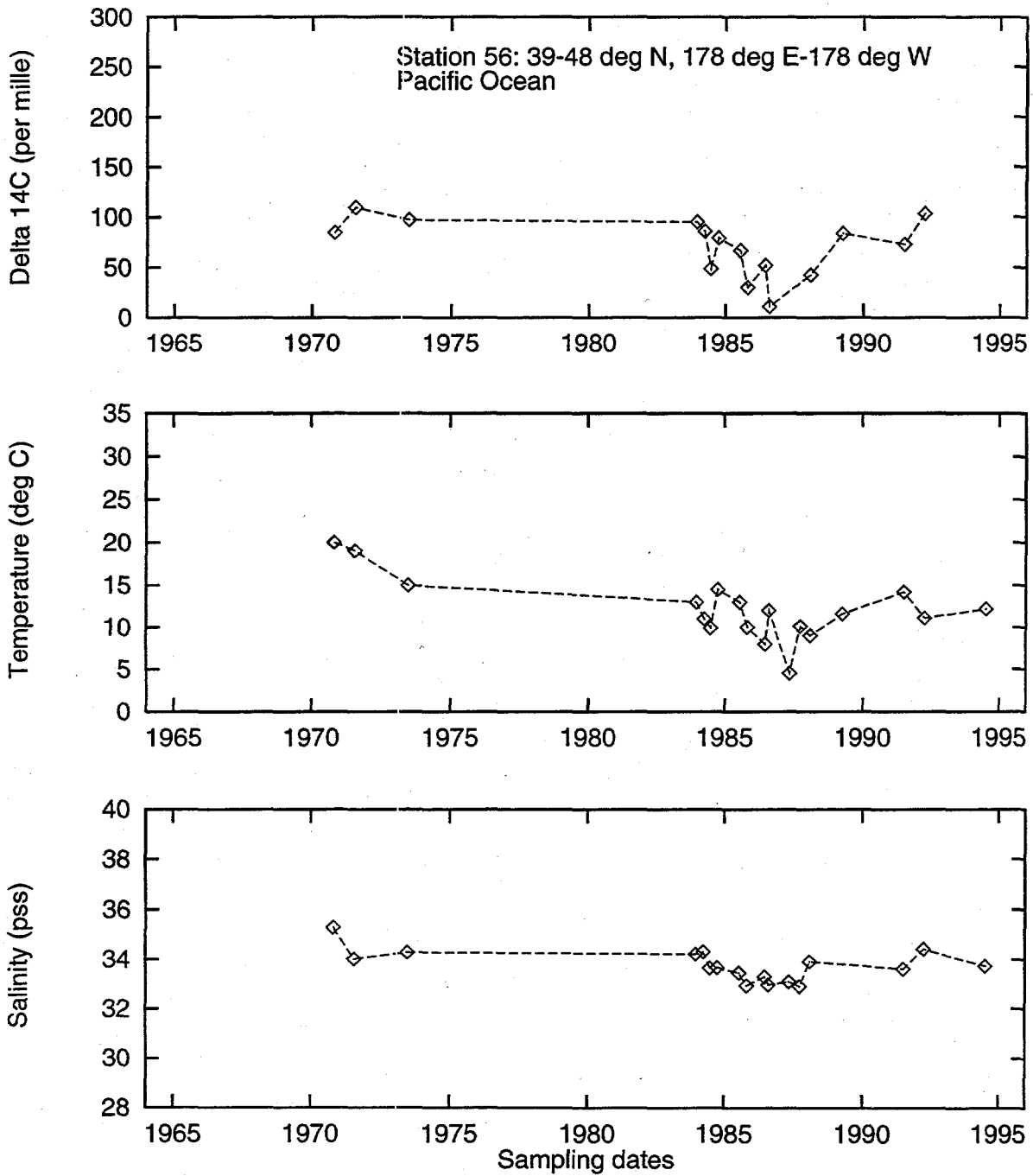


Figure A.19. Pacific Ocean Station 56 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

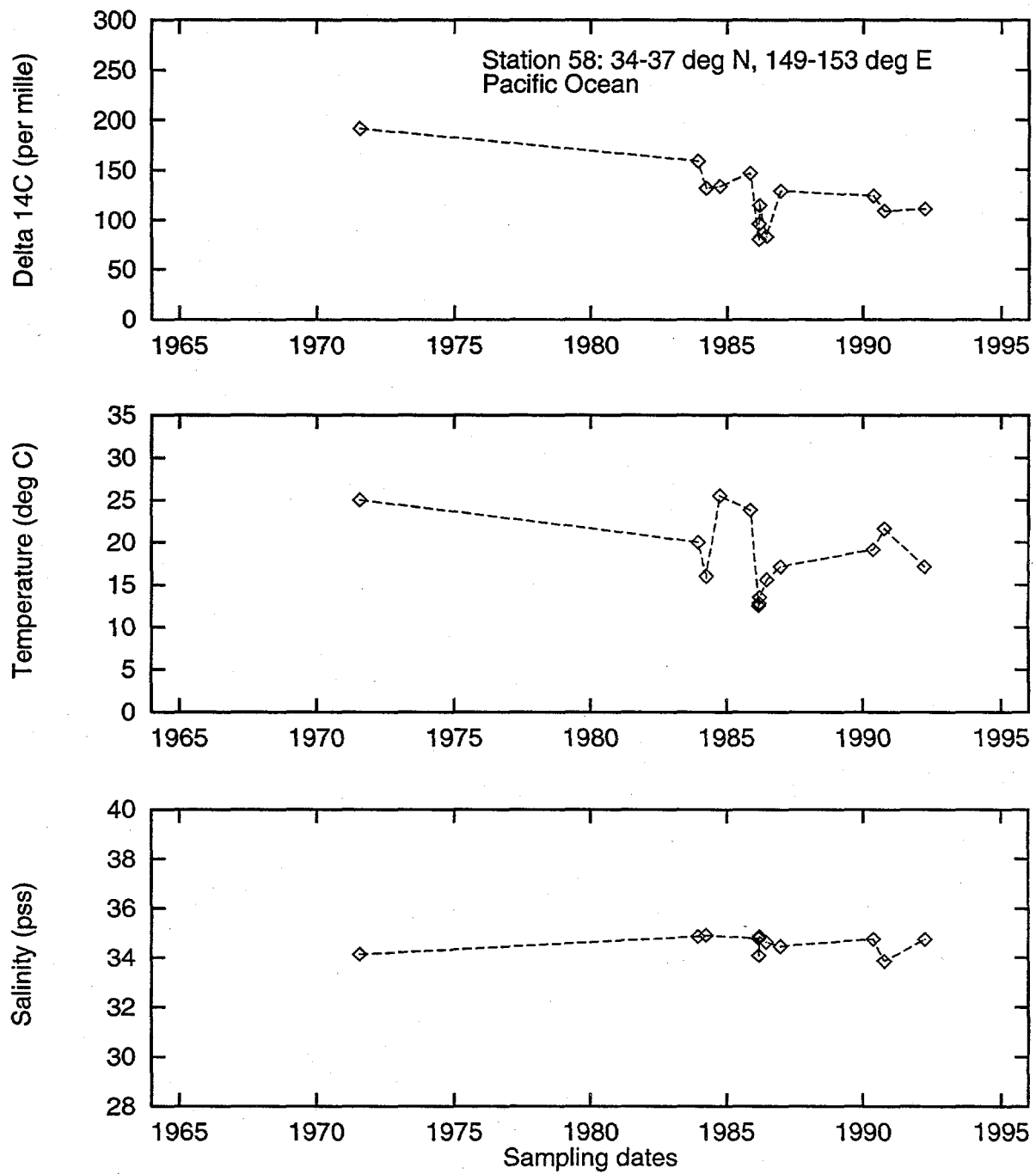


Figure A.20. Pacific Ocean Station 58 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

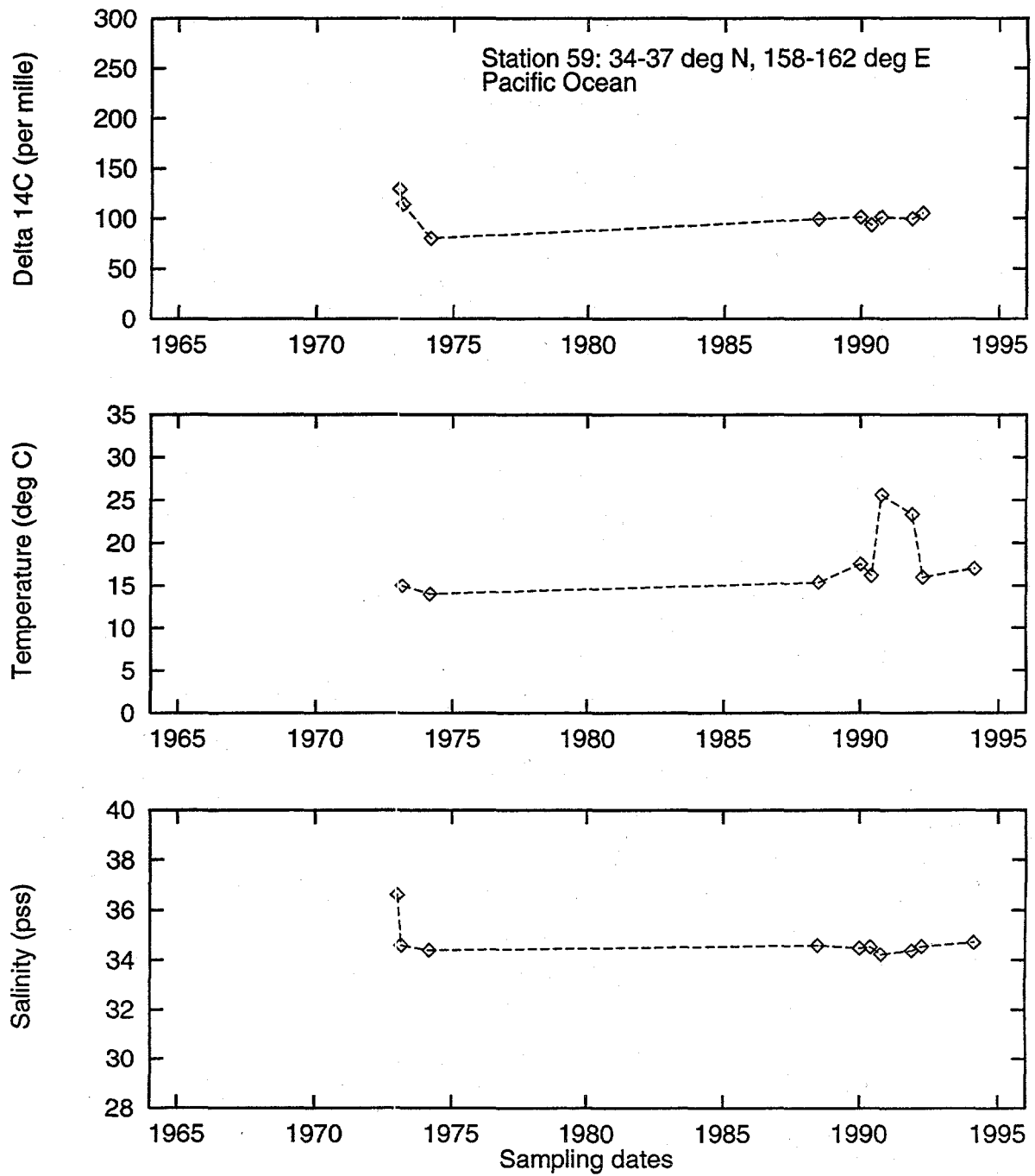


Figure A.21. Pacific Ocean Station 59 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.



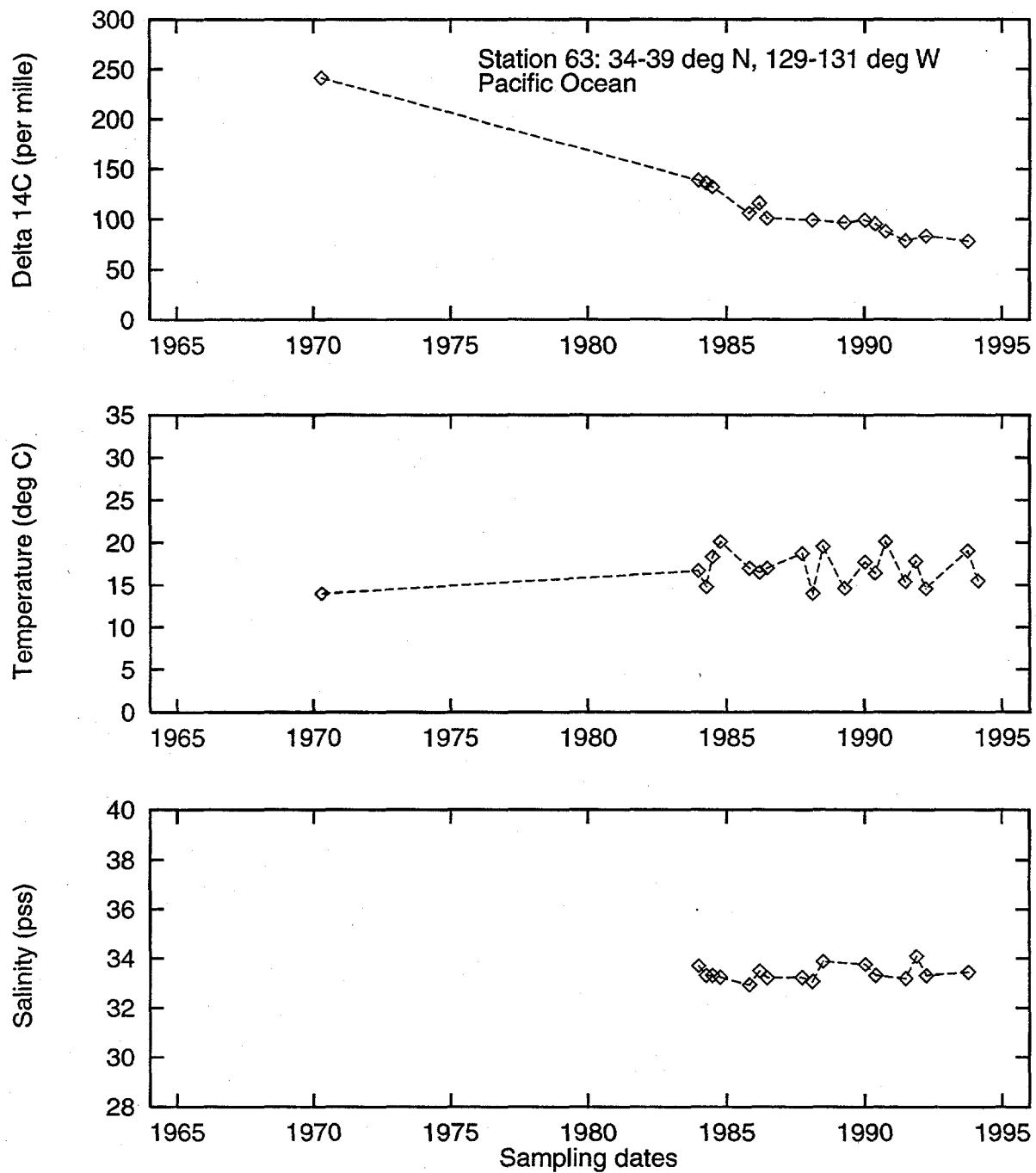


Figure A.22. Pacific Ocean Station 63 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

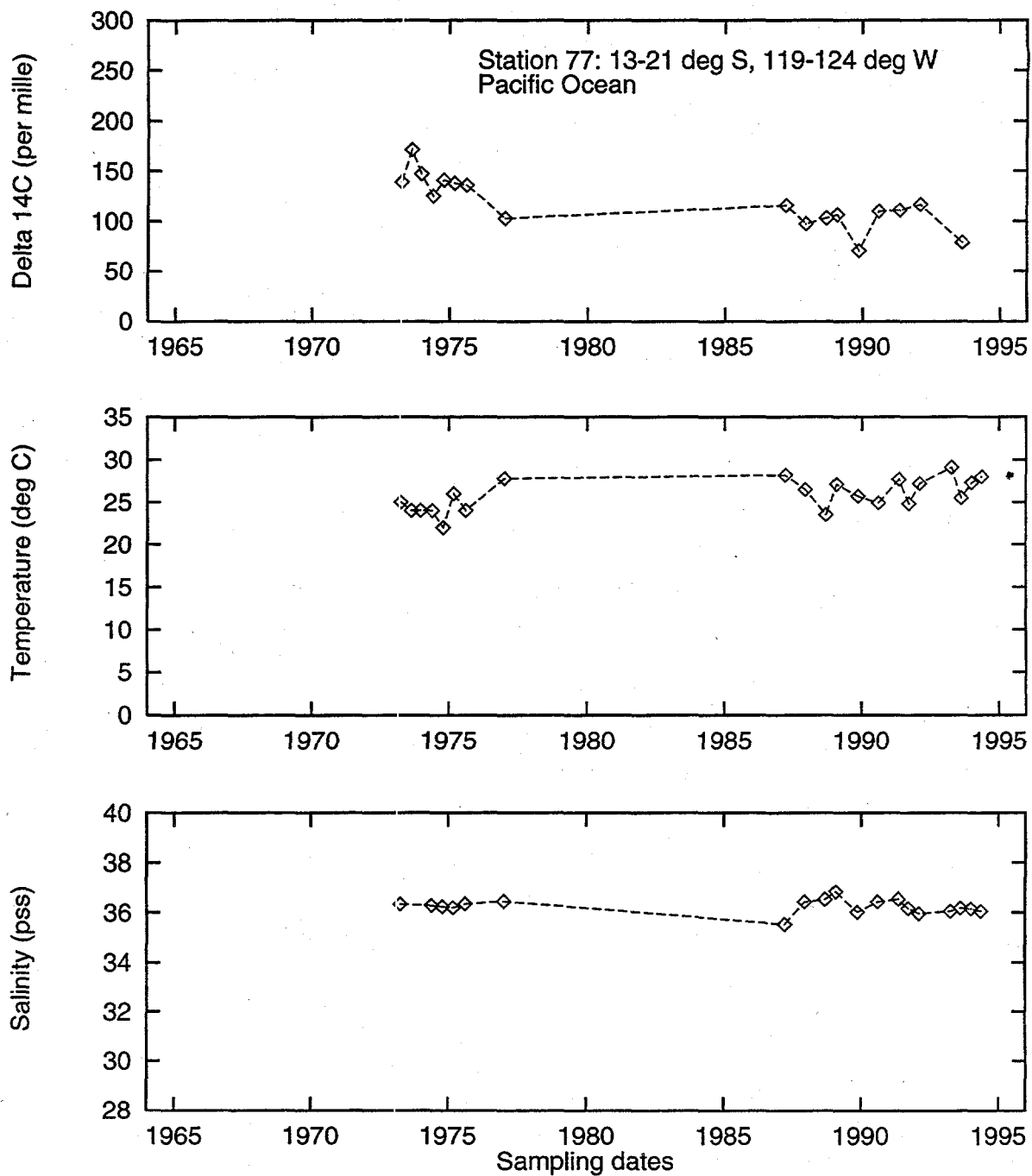


Figure A.23. Pacific Ocean Station 77 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

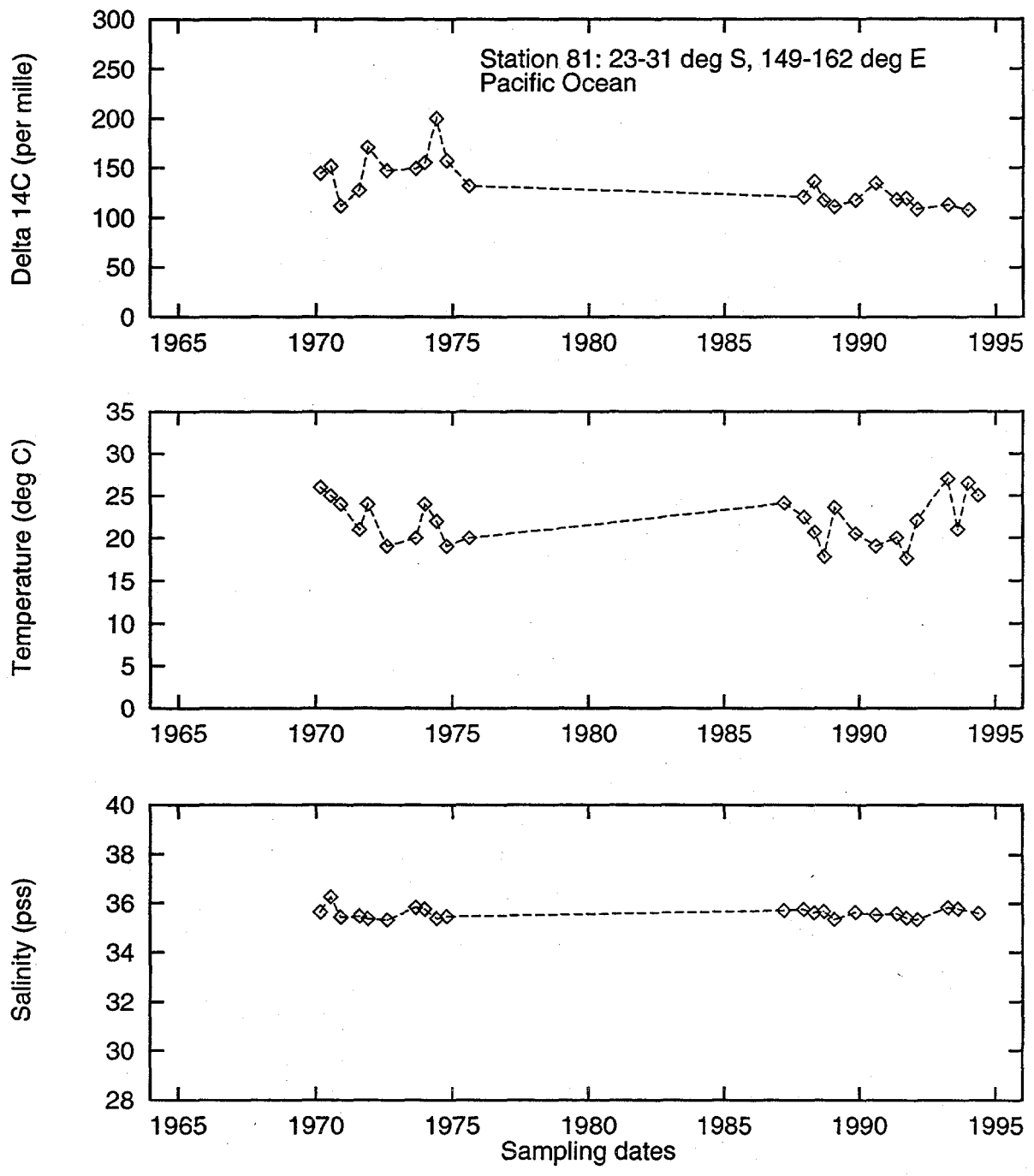


Figure A.24. Pacific Ocean Station 81 corrected <sup>14</sup>C measurements, temperature data, and salinity data over time.

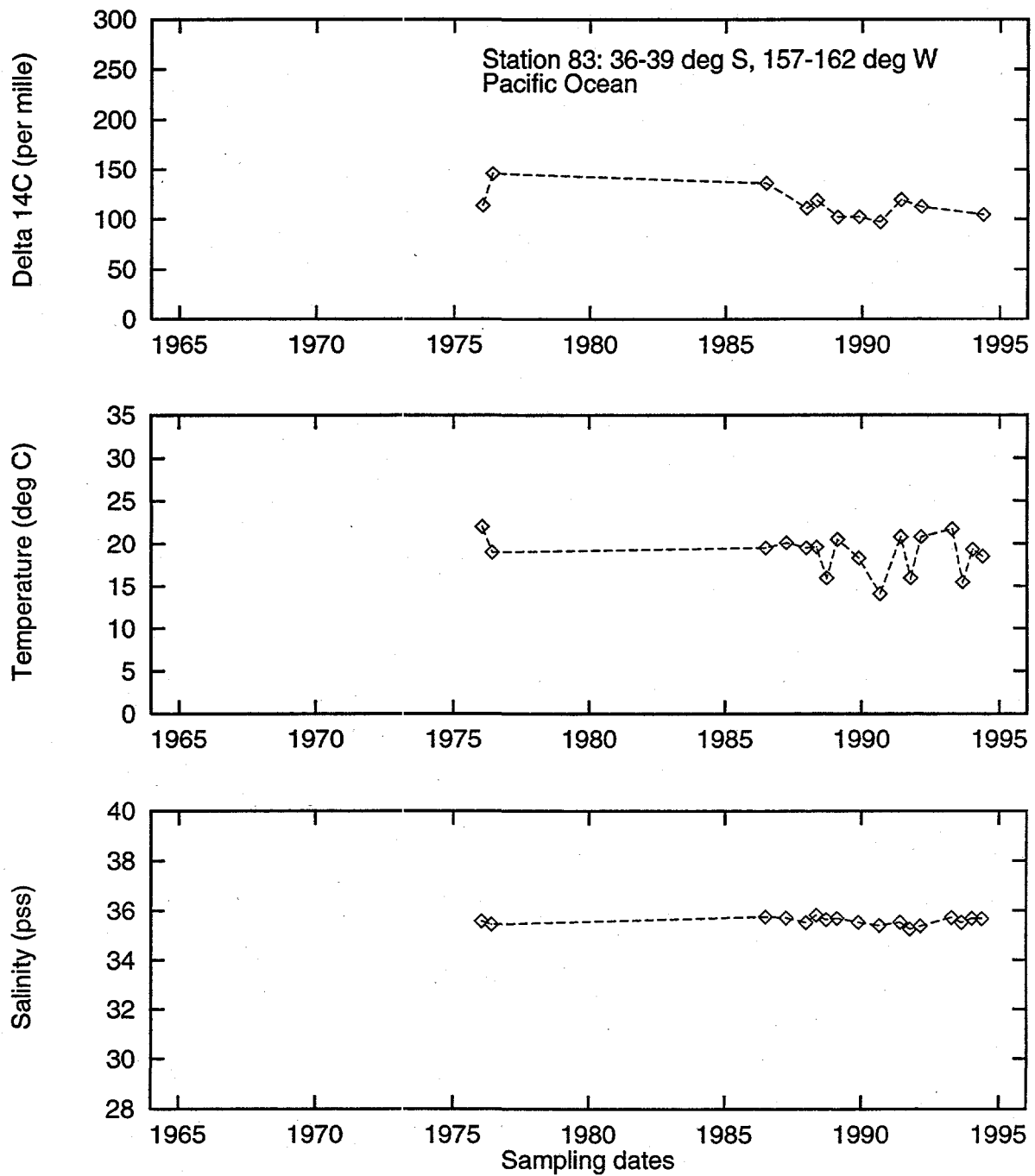


Figure A.25. Pacific Ocean Station 83 corrected  $^{14}\text{C}$  measurements, temperature data, and salinity data over time.

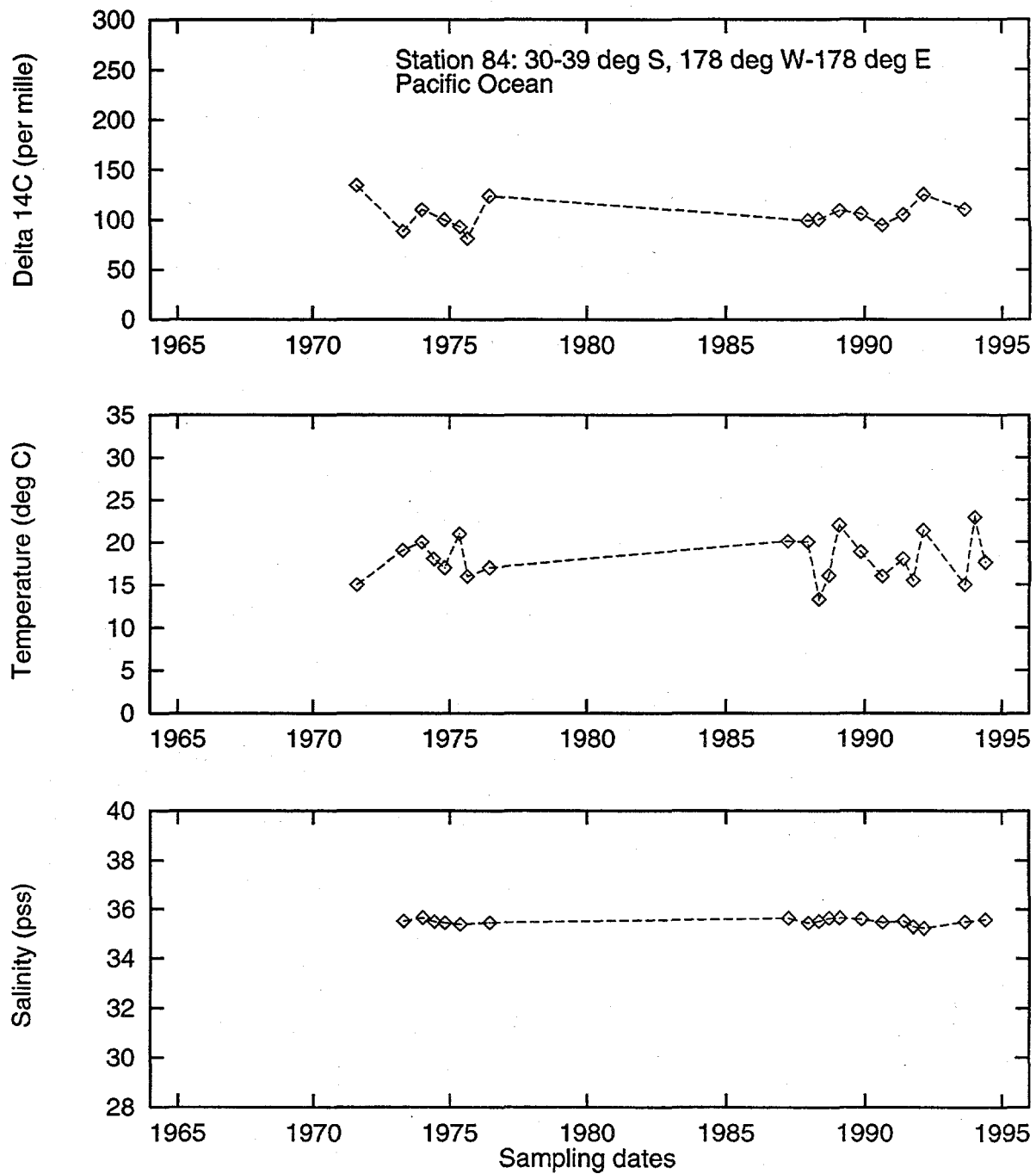


Figure A.26. Pacific Ocean Station 84 corrected <sup>14</sup>C measurements, temperature data, and salinity data over time.